ANNUAL REPORT ON RESULTS OF MAMMOTH COMMUNITY WATER DISTRICT GROUNDWATER MONITORING PROGRAM FOR OCTOBER 2018-SEPTEMBER 2019

Prepared for
Mammoth Community Water District
Mammoth Lakes, California

by
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February 2020

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February 27, 2020

Mr. Mark Busby, General Manager
Mammoth Community Water District
P.O. Box 597
Mammoth Lakes, CA 93546

Re: Annual Report on Groundwater Monitoring

Dear Mark:

Submitted herewith is our annual report on the results of the District groundwater monitoring program for the period October 2018-September 2019. I appreciate the cooperation of District personnel in conducting this monitoring and providing data tabulations and hydrographs.

Sincerely Yours,

Kenneth D. Schmidt
Geologist No. 1578
Certified Hydrogeologist
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KDS/td

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ANNUAL REPORT ON RESULTS OF MAMMOTH COMMUNITY WATER DISTRICT GROUNDWATER MONITORING PROGRAM FOR OCTOBER 2018-SEPTEMBER 2019

INTRODUCTION

In Summer 1992, the Mammoth County Water District contracted for the drilling of five test wells in Mammoth Lakes. One of these wells (No. 15) was converted to a supply well and pumping began on an emergency basis in Summer 1992. In December 1992, the California Department of Fish and Game filed an action against the District in Superior Court. Concerns were expressed by the Department about the potential impact of pumping of these wells on wildlife, vegetation, and fishery resources of Mammoth Creek and the Hot Creek headsprings, which is located downstream of the District wells. Kenneth D. Schmidt and Associates (KDSA) completed a hydrogeologic evaluation (July 6, 1993) on behalf of the District, to respond to these concerns. In August 1993, a settlement agreement was made between the Department and the District. As part of this agreement, the District was to:

1. Conduct routine monitoring in all District supply and monitor wells.
2. Install a new monitor well tapping consolidated rock at a location south of the District office.
3. Conduct monitoring in the new monitor well.
4. Prepare annual interpretive reports on the results of groundwater monitoring for the water year.

Data available to the District from Wells SC-1 and SC-2 (part of the Long Valley hydrologic monitoring program) were to be included in this evaluation. This report comprises the twenty-seventh annual report pursuant to the settlement agreement. The Mammoth County Water District is now the Mammoth Community Water District.

SUMMARY AND CONCLUSIONS

The District pumped 169 acre-feet of water from nine supply wells during the 2019 water year. This was 14 acre-feet less than the pumpage for the previous water year, and 86 percent less than the mean pumpage for 1983-2019 (1,282 acre-feet). A comprehensive water-level monitoring program was conducted for District supply wells and monitor wells. In addition, water-level measurements were available for two other monitor wells east of the District wells. Flow measurements were not available for the springs at the University of California Valentine Reserve for the 2019 water year.

Water levels in many shallow wells tapping the uppermost glacial till rose during 2019, due to the greater precipitation than for the previous year. Groundwater is generally present in the uppermost strata only in the westerly and central part of the area, in the meadow and near Mammoth Creek. Water levels in most of the

District supply wells and in other deep wells tapping the consolidated rock in or near the District well field rose or were stable during the 2019 water year. A water-level elevation contour map was prepared for late September 2019. This map and other information indicate that the extent of the cone of depression due to pumping of District wells was limited in size, and did not extend to the east to District Monitor Well No. 24 or 26.

The results of water quality monitoring during the 2019 water year indicated the same trends as previous monitoring.

The results of the 2019 water year monitoring indicate that District pumping did not influence Mammoth Creek streamflow. Flow data for the springs at the Valentine Reserve for the 2002-19 water years are not available. District pumping was not indicated to have influenced flows at the Valentine Reserve springs through the 2001 water year (the last year of available records). In addition, water-level declines due to pumping did not extend beyond the vicinity of the District well field. Thus, there was no influence on the Hot Creek headsprings, which are much more distant from the District water supply wells than the monitor wells utilized for the District monitoring program.

WELL CONSTRUCTION DATA

Figure 1 shows locations of District wells, a private supply

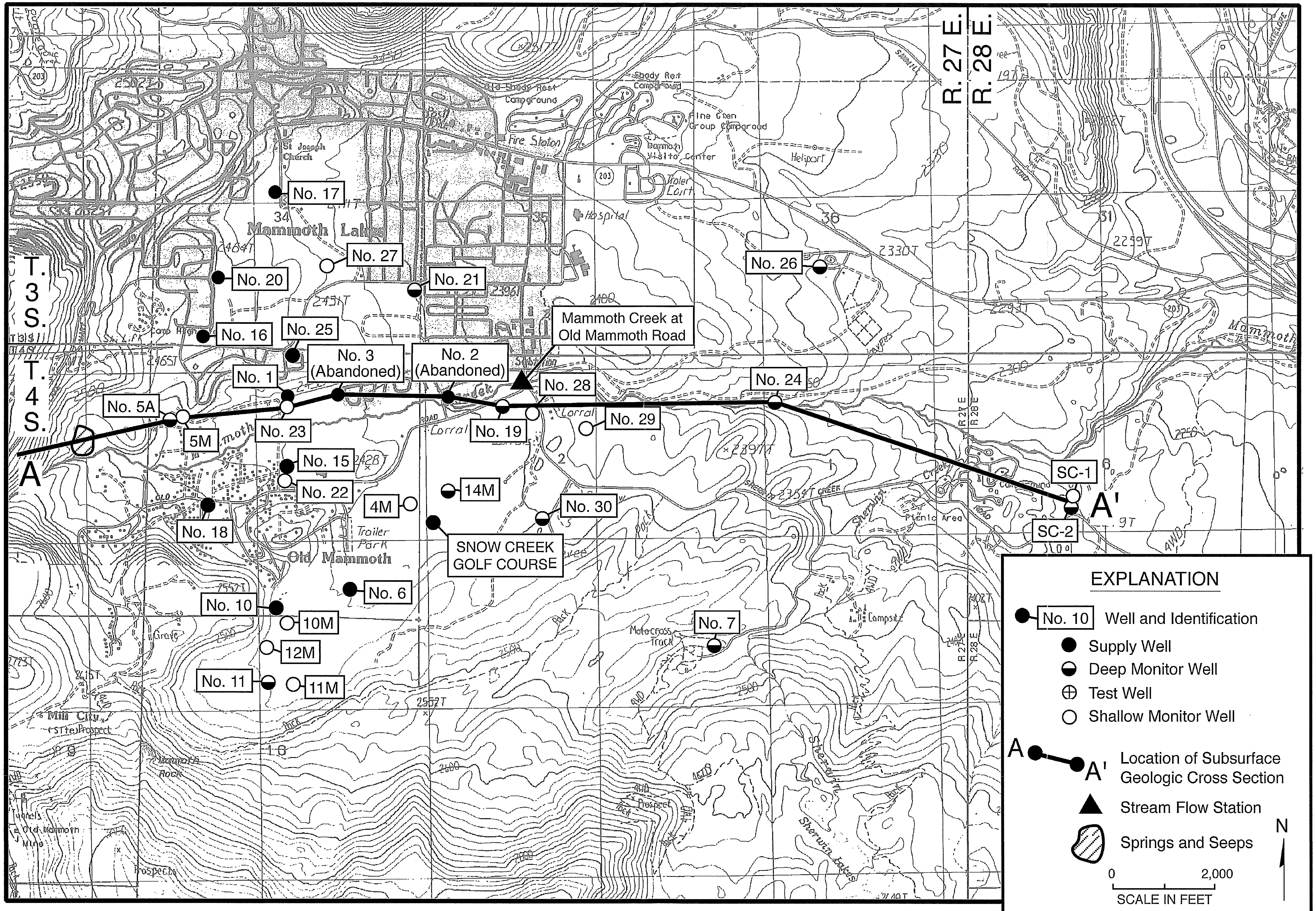

FIGURE 1 - LOCATION OF WELLS AND SUBSURFACE GEOLOGIC CROSS-SECTION A-A'

well, a subsurface geologic cross section, two other monitor wells to the east (SC-1 and SC-2), and the spring area at the Valentine Reserve. Table 1 summarizes construction data for the District supply wells. All of these wells tap consolidated rock, primarily basalt and scoria layers, and some also tap interbedded glacial till and conglomerate. Well No. 1 has been in service since the 1970's and Wells No. 6 and 10 have been in service since 1988. These three wells are termed the "earlier" District supply wells in this report. Well No. 15 was first put in service in July 1992 on an emergency basis. Well No. 18 was put in service in September 1994. Wells No. 16 and 20 were put in service in March 1995, and Well No. 17 was put in service in June 1995. Well No. 25 was drilled in August 2002, and was not pumped during the 2002-2013 water years. Well No. 25 was first put in service in February 2014. This well had been previously used as a monitor well. Wells put in service after 1991 are termed the "newer" District supply wells in this report. Wells No. 2, 3, 4, 5, and 7 (shown in Figure 1) were not put in service by the District because of low well yields. Wells No. 2 and 3 were subsequently destroyed, whereas the other wells were converted to monitor wells. Table 2 summarizes construction data for District monitor wells. Seven of these wells (No. 5A, 14M, 19, 21, 24, 26, and 30) are

TABLE 1 - CONSTRUCTION DATA FOR DISTRICT SUPPLY WELLS

Well No.	Date Drilled	Drilled Depth (feet)	Cased Depth (feet)	Perforated or Open Interval (feet)	Annular Seal (feet)
1	1976	382	370	200-370	0-90
6	11/87	670	670	146-670	0-52
10	10/87	700	700	136-700	0-52
15	8/92	720	407	407-720	0-135
16	8/92	710	715	420-470 500-680	0-60
17	7/92	710	513	400-710	0-60
18	8/92	710	480	90-150 240-470	0-60
20	9/92	710	420	420-710	0-60
25	8/02	700	530	340-530	0-60

Wells No. 16, 17, 18, and 20 were modified in June 1994 in preparation for being put into service. The test wells that were drilled in 1992 and subsequently converted to production wells are termed herein the "new District supply wells".

TABLE 2 - CONSTRUCTION DATA FOR DISTRICT MONITOR WELLS

Well No.	Date Drilled	Drilled Depth (feet)	Cased Depth (feet)	Perforated or Open Interval (feet)	Annular Seal (feet)
4M	1984	89	89	69-89	0-50
5A	7/82 (8/93)	357	357	112-357	0-112
5M	8/93	80	80	20-75	0-20
7	8/87	480	480	290-480	0-50
10M	6/88	27	27	7-27	0-5
11	7/88	600	600	170-360	0-50
11M	6/88	43	43	5-43	0-5
12M	9/88	27	27	7-27	0-5
14M	9/88	520	501	100-310	0-100
19	8/92	700	344	200-700	0-140
21	10/92 (7/97)	640	145 (157)	145-640 (157-640)	(70-157)
22	9/92	85	85	55-85	0-25
23	9/92	65	65	30-65	0-25
24	8/93	450	430	300-450	0-20
26	5/06	708	686	621-686	0-80 &
					595-620
27	1/06	97	87	67-87	0-64
28	12/05	90	87	47-57	0-45
				67-87	57-65
29	11/05	97	97	77-97	0-60
30	12/05	640	600	516-600	0-500

Well No. 5 was modified in August 1993, so as to be sealed off opposite the glacial till and be perforated only opposite the volcanic rock, and re-designated Well No. 5A. An annular seal was placed in No. 21 in July 1997, and the values in parentheses are for the modified well.

relatively deep and primarily tap water in fractured volcanic rock. An annular seal was placed in Well No. 21 in July 1997, to preclude surface water and shallow groundwater from entering the well. Well No. 7 is a deep monitor well located south of the basalt flow and taps water in a glacial morraine near Sherwin Creek. Well No. 11 is a deep well located south of the basalt flow and taps water in glacial till and granitic rocks. Well No. 5M taps water in the shallow fractured volcanic rock, just beneath the glacial till. The remaining monitor wells are shallow and tap groundwater in the uppermost glacial till or alluvium.

SUBSURFACE GEOLOGIC SECTION A-A'

Cross Section A-A' was developed during a previous evaluation, and was updated (Figure 2) by adding more recent water-level data. The locations of wells used for this section are shown in Figure 1. Cross Section A-A' shows that the uppermost till layer and volcanic rocks are continuous along the section. Groundwater has been found in the uppermost glacial till layer only in the vicinity of District Wells No. 1, 4, 6, 10, 11, 12, and 15. Most of these wells are either in the meadow or near Mammoth Creek. Water production in the District supply wells is from highly fractured rock, scoria layers, and sometimes from interbedded

FIGURE 2

SUBSURFACE GEOLOGIC CROSS SECTION A-A'
(IN POCKET)

glacial till. The intervening less fractured rock probably acts as local confining layers. At Well No. 24, water was not found in the upper part of the basalt or in either of the till layers. Water in this well is in a fractured scoria layer. A lost circulation zone present in this well may influence the water level. In late September 2019, there was a fairly uniform water-level slope (about 200 feet per mile) from Well No. 1 to No. 19 to No. 24. The part of the section east of Well No. 24 is oriented almost perpendicular to the direction of groundwater flow (shown later).

PRECIPITATION

Precipitation (inches of water) is routinely measured at the Lake Mary Store, and is an indication of the potential recharge to groundwater. The mean annual precipitation from 1990-2019 was 28.1 inches. The range in annual precipitation has been large, as the following discussion indicates. Annual precipitation at the Lake Mary Store averaged only 15.9 inches during the 2006-08 water years. During the 2012-15 water years, the average annual precipitation was 17.2 inches. During water years 1991-94 and 2001-04 the annual precipitation averaged 22.0 to 22.5 inches. During water years 1995-2000, annual precipitation averaged about 39 inches. During the 2005-06 water year, the annual precipitation was 47.4 inches.

During the 2017 water year, the precipitation was 55.5 inches, the greatest annual precipitation of record. During the 2018 water year, the precipitation was only 23.4 inches. During the 2019 water year, the annual precipitation was 30.7 inches, about two and a half inches more than the mean. Trends in precipitation are useful when evaluating water-level changes in wells that have been measured as part of this program.

DISTRICT PUMPAGE

Pumpage records for District supply wells are provided in Appendix A. Table 3 shows monthly pumpage from District wells during the 2019 water year. The total pumpage was 169 acre-feet, or 14 acre-feet less than for the previous water year. Of the 2019 pumpage, 78 acre-feet were from Well No. 1. From 11 to 16 acre-feet were pumped from each of Wells No. 6, 10, 15, 17, 18, and 25. From five to six acre-feet were pumped from each of Well No. 16 and Well No. 20. Records for the Snow Creek Golf Course Well (in the vicinity of Well No. 14M) show that 15 acre-feet were pumped during the 2019 water year. This well is owned by a private entity. A small amount of water was pumped from Well No. 7 for use at the Boys Camp during 2019. The mean annual District pumpage for the 1984 to 2019 water years was 1,282 acre-feet.

TABLE 3-PUMPAGE FROM DISTRICT SUPPLY WELLS

MG Totals	Months and Years													
	2018			2019									MG	ACFT
Wells	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep		
1	0.11	0.02	0.01	0.12	0.10	0.03	0.09	0.05	0.27	10.92	12.70	1.08	25.51	78.25
6	0.83	0.04	0.36	0.18	0.02	0.52	0.16	0.05	0.05	1.65	0.06	0.07	4.00	12.28
10	0.83	0.04	0.36	0.17	0.02	0.51	0.16	0.22	0.07	1.61	0.05	0.07	4.12	12.64
15	0.73	0.04	0.33	0.16	0.02	0.48	0.14	0.05	0.04	1.50	0.05	0.06	3.60	11.05
16	0.69	0.35	0.01	0.06	0.01	0.02	0.04	0.01	0.60	0.04	0.02	0.01	1.86	5.70
17	0.13	0.03	0.25	0.23	0.08	0.05	0.12	0.02	3.11	0.89	0.50	0.06	5.47	16.76
18	0.48	0.55	1.71	0.87	0.00	0.01	0.01	0.02	0.01	0.01	0.01	0.01	3.68	11.30
20	0.13	0.02	0.18	0.16	0.06	0.01	0.10	0.02	0.04	0.62	0.34	0.03	1.70	5.20
25	1.38	0.55	0.16	0.10	0.07	0.03	0.11	0.01	2.00	0.53	0.31	0.04	5.28	16.20
MG	5.32	1.64	3.38	2.05	0.37	1.67	0.94	0.44	6.18	17.77	14.04	1.43	55.22	169.40
ACFT	16.31	5.02	10.36	6.30	1.12	5.11	2.88	1.36	18.96	54.52	43.07	4.39	169.40	

WATER LEVELS

District Supply Wells

Water-level measurements (static and pumping) for District supply wells are provided in Appendix A. Water-level hydrographs for the earlier wells (No. 1, 6, and 10) are provided in Appendix B.

Newer Wells

Figure 3 is a water-level and pumpage hydrograph for Well No. 15, extending back to when it was initially put in service in July 1992. In Summer 1992, the water level fell about 80 feet after several months of pumping, and normally ranged from about 260 to 280 feet during periods when the well was being significantly used through early 1995. During periods when the well was not used much for supply (i.e., May 1995-June 1998), the water level rose substantially. In June 1998, the depth to water in Well No. 15 was 156 feet, or the shallowest of record. In October 2003, depth to water in this well was 303 feet, which was the deepest of record at that time. The shallowest annual water level in this well fell from 156 feet in 1998 to 242 feet in 2004. The water level in this well in Summer 2005 was near that in Summer 2004. In 2007, the shallowest water level was about ten feet shallower than in 2005. In late Summer 2007, the

FIGURE 3-WATER-LEVEL AND PUMPAGE HYDROGRAPH FOR WELL NO. 15

shallowest water level was about 50 feet deeper than in 2006. In September 2008, depth to water in Well No. 15 was 310 feet, the deepest of record. The water level rose about 30 feet between late 2008 and mid-2009 and then fell about 17 feet after July 2009. The water level in this well rose substantially between September 2009 and June 2011, primarily due to substantially reduced pumping from this well. Depth to water in Well No. 15 was 198 feet in late June 2011. There are no water-level measurements after September 2011 and before June 18, 2013, because the transducer failed and could not be removed for replacement. The transducer in Well No. 15 was replaced on June 18, 2013. The water level was relatively shallow in June 2013 and fell about 22 feet by the end of the 2013 water year, associated with pumping of this well. The water level in Well No. 15 rose 10 feet between mid-October 2013 and June 2014, then fell 28 feet by the end of the water year. The water level in this well rose about three feet through mid-January 2015, then fell about 24 feet by the end of the 2015 water year. The water-level declines during 2013-15 were due to heavy pumping from this well. During the 2016 water year the water level in this well rose 26 feet, in the 2017 water year the water level rose about 27 feet, and in the 2018 water year the water level rose about 23 feet. During the 2019 water year, the water level rose about four feet. Depth to water in Well No. 15 appears to be influenced primarily by the previous pumping history of the well and recharge.

Figure 4 is a water-level and pumpage hydrograph for Well No. 16. The water level in this well changed substantially after the casing was installed (July 1994) and after the pump was installed (February 1995). After the casing was installed and prior to the pump installation, an access tube was not in the well, and the measurements during that period were apparently affected by cascading water. The measurements for July 1994-early February 1995, and for April-May, 1998 appear to not be representative. During heavy pumping periods of Well No. 20, the static level in Well No. 16 has been about 12 feet lower than during periods of lower pumping of Well No. 20. There were seasonal declines of about 20 to 30 feet during pumping periods of Well No. 16 in 2002. Overall, shallow static levels in this well were relatively stable between 1992 and 2003, and fell in 2004. Water levels in this well were the lowest of record in Summer 2004. This is likely due to the below normal precipitation in previous years. Water levels in this well slightly rose during 2005, and then rose about ten feet during the 2006 water year. There was essentially no pumpage from this well during the 2006 water year. Pumpage from Well No. 16 resumed in 2007

FIGURE 4-WATER-LEVEL AND PUMPAGE HYDROGRAPH FOR WELL NO. 16

and in 2008. Because of a restriction in the sounding tube, the water level in this well wasn't measured between July 2006 and mid April 2010. In April 2010, a transducer was installed and reliable transducer records are available from April 19, 2010 through March 2012. The water level in this well rose seven feet between April-September 2010, and then rose slightly through September 2011. The water level rose five feet from September 2011 through March 2012. The transducer failed after March 2012 and was replaced on October 16, 2012. The water level in this well rose about 20 feet between October 16, 2012 and May 2013. The water level then fell about 11 feet by the end of the 2013 water year. The water level in Well No. 16 rose five feet between September and November 2013, then fell about nine feet by the end of the 2014 water year. Pumpage from this well was relatively small during the 2013 and 2014 water years. The water level in Well No. 16 rose about three feet through mid-December 2014, then fell about 14 feet by the end of the 2015 water year. The water level in this well rose during the 2016 water year, and pumpage from the well was low. The water level in Well No. 16 rose about 10 feet during the 2017 water year, five feet during the 2018 water year, and six feet during the 2019 water year.

Figure 5 is a water-level and pumpage hydrograph for Well No.

FIGURE 5-WATER-LEVEL AND PUMPAGE HYDROGRAPH FOR WELL NO. 17

17. Measurements in early 1995 indicated that the water level apparently rose about eight feet, probably due to recharge. The water level in Well No. 17 also appears to be influenced by pumpage of Well No. 20. During operational periods of both of these wells, the static level in Well No. 17 has been about four feet lower than during periods of little pumpage. The water level in Well No. 17 gradually rose during November 1995-August 1999, except during some relatively short periods. The shallowest depth to water yet measured in this well was in January 2000. The water level in this well fell during 2000-2005 due to heavier pumping of this well and less recharge compared to previously. The water level in this well rose about nine feet during 2006 and early 2007 due to recharge. The water level in Well No. 17 rose about a foot in late 2007 and early 2008, and the water level then fell about four feet through September 2008. The water level rose three feet in November 2008 and then fell four feet through March 2009. The water level then rose six feet through July 2009, and then fell one foot through September 2009. The water level in Well No. 17 fell through January 2010, was stable for January-June, 2010, then fell from June to November 2010 due to pumping of the well. The water level slightly rose through January 2011, then fell through June 2011 due to pumping. After pumping of Well No. 17 stopped, the water

level rose about 14 feet through early April 2012. The water level then fell three and a half feet by the end of September 2012. The transducer in Well No. 17 failed on November 11, 2012. The transducer was repaired and water-level measurements were resumed on April 29, 2013. The water level rose about one foot between April 29 and mid-July 2013, then fell about a foot and a half by the end of the 2013 water year. The water level in Well No. 17 rose about two and a half feet between October 2013 and January 2014, then fell about five feet by the end of the water year. The water level in this well rose about one foot through late November 2014, then fell about eight feet by the end of the 2015 water year. Between June and September, 2015, the water level in this well was the deepest of record at that time. The water level in Well No. 17 fell during the 2016 water year, to the deepest level of record by the end of the year. This was associated with significant pumpage of the well. The water level in this well rose about two feet during the 2017 water year, six feet during the 2018 water year, and three feet during the 2019 water year.

Figure 6 shows water levels and pumpage for Well No. 18. The overall trend for this well during non-operational periods was a slight water-level rise through 1997. The water level was relatively constant during 1998-early 2002. In early June 1998, the

FIGURE 6-WATER-LEVEL AND PUMPAGE HYDROGRAPH FOR WELL NO. 18

water level in Well No. 18 was 30 feet deep, the shallowest yet measured. The water-level decline of about ten feet in this well during July 1998 appears to have been due to pumping of Wells No. 10 and 15. The water level in this well was 108 feet in September 2002, the lowest for the period of record. Water levels in this well stayed relatively constant during 2002-05. The water level rose almost 40 feet during the 2006 water year, primarily due to increased recharge. The water level in this well fell about 45 to 50 feet after March 2007, and this was primarily due to pumpage of the well. The water level in this well stayed about 100 feet deep between July 2007 and December 2008, fell about six feet by April 2009 (due to pumping of the well), then rose about 20 feet by September 2009. There was little pumpage from this well during 2010-11, and the water level rose to a depth of about 44 feet by July 2011. The water level was stable through June 2012, and then fell about 17 feet by the end of September 2012. The transducer was taken off-line in October 2012 for a water treatment facility upgrade, and no measurements are available for the 2013 water year. Water-level measurements were resumed in October 2013. The water level in Well No. 18 rose about 11 feet between October 2013 and June 2014, then fell about 18 feet by the end of the 2014 water year. The water level in this well rose about six feet by early January

2015, then fell from two to three feet during the rest of the 2015 water year. The water level recovered by December 2015 and remained stable during 2016. The water level in Well No. 18 rose about 34 feet during the 2017 water year, associated with recharge due to the higher precipitation. The water level rose about five feet during the 2018 water year, and about five feet during the 2019 water year.

Figure 7 is a water-level and pumpage hydrograph for Well No. 20. From 1994-98, the overall trend was a rising water level. The shallowest levels in Well No. 20 to date were in late 1998 and early 1999. The water level in this well fell after early 2001. The water-level declines in this well during the summers of 1999-2002 were mainly due to pumping of the well itself. The water level in this well may also be affected by pumpage of Well No. 17. The water level in Well No. 20 recovered significantly in 2003, due to a lack of pumping prior to August. During 2002-05, water levels in this well stayed relatively constant. The water level rose almost 20 feet during 2006-07. After early June 2007, the water level in this well fell about 40 feet, primarily due to pumping of the well. The water level rose after September 2007 through August 2008, then fell in September 2008. The water level rose ten feet from November 2008 to June 2009, then fell eight feet through September 2009 (due to pumpage of

FIGURE 7-WATER-LEVEL AND PUMPAGE HYDROGRAPH FOR WELL NO. 20

the well). The water level rose between January and April 2010, when the pumpage from the well was small, and remained relatively stable through February 2011 due to low pumpage. The water level fell about five feet due to pumping of the well in July and August 2011, then recovered after pumping stopped. The water level rose 28 feet from September 2011 through May 2012, then fell 18 feet by the end of September 2012, primarily due to pumping of the well. The water level then rose about 12 feet through January 2013. The water level then fell about 31 feet by early August 2013, associated with pumping of this well. No water-level measurements are available for the rest of the water year. Water-level measurement were resumed in October 2013. The water level rose about 10 feet between August and October 2013 and about 15 feet from October 2013 through May 2014. The water level in this well fell about 33 feet between May 2014 and mid February 2015. The water level then rose about eight feet by mid June and fell about 10 to 11 feet by the end of the 2015 water year. The water level in Well No. 20 rose during the 2016 water year, associated with minimal pumpage. The water level in this well rose about seven feet during the 2017 water year, seven feet during the 2018 water year, and about four feet during the 2019 water year.

Figure 8 is a water-level and pumpage hydrograph for Well

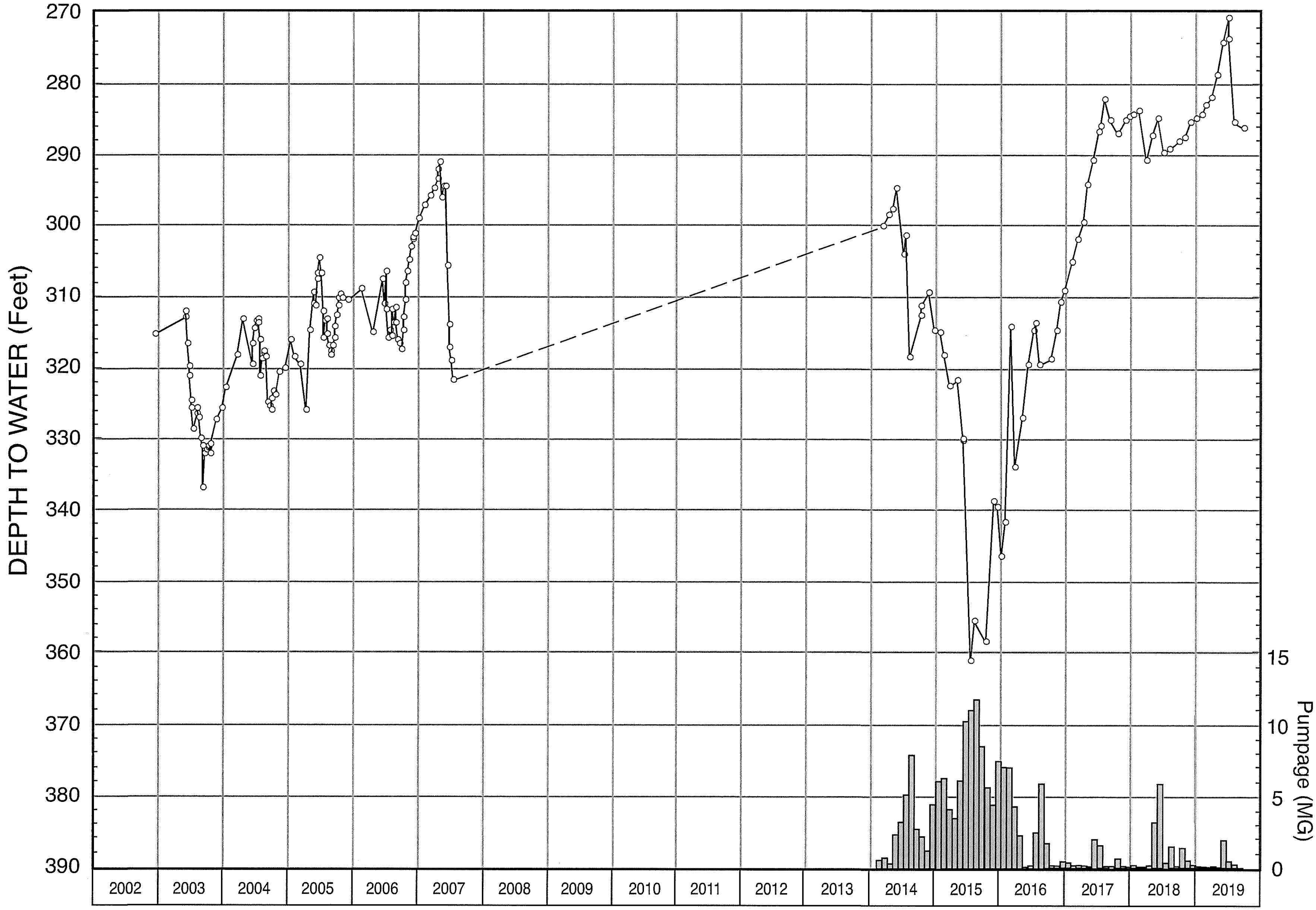

FIGURE 8 - WATER-LEVEL AND PUMPAGE HYDROGRAPH FOR WELL NO. 25

No. 25. Well No. 25 is located north of District Well No. 1. Although Well No. 25 has been equipped as a supply well, it was not pumped through the end of the 2013 water year. Water-level measurements for Well No. 25 commenced in late 2002 and are available through July 2007 and in 2014. Water levels in this well were not measured between July 2007 and February 2011 because of no access. Prior to 2008, the water level in Well No. 25 responded primarily to pumpage of nearby District Well No. 1. Depth to water has ranged from 291 to 337 feet, and has been greatest during the late summer when Well No. 1 has been pumping. The water level in this well rose during 2002-2007, and the shallowest measured water level to date was in May 2007. In February 2014 Well No. 25 was put in service as a supply well, and level measurements were also resumed at the same time. After March 2014, the water level fell from about 295 to 318 feet in depth by August 2014. The water level in this well rose about nine feet between August and mid November of 2014. The water level in Well No. 25 then fell about 52 feet by mid July 2015, associated with more pumping from the well. During July-September, the water level in this well was the deepest of record. For the rest of the 2015 water year, the water level in this well was relatively stable. The water level in Well No. 25 rose during the 2016 water year, associated with less pumping from the well. During the 2017 water year, the water level in this well rose about 34 feet, to the shallowest level of record. During the 2018 water year the water level fell about two feet. During the 2019 water year the water level rose about two feet.

Earlier Wells

Water-level and pumpage hydrographs for Wells No. 1, 6, and 10 are provided in Appendix B. The static water level in Well No. 1 has ranged from about 160 to 200 feet during low pumping periods to an average of about 270 feet during heavy pumping periods (i.e., August 1994). Overall, the water level in this well rose between 1992 and 1997, slightly declined from 1997 to Spring 2002, fell during 2002-03, and then rose in 2004-05. In June 1998, depth to water in this well was 160 feet, or the shallowest measured since 1990. During the 2006 water year, the water level in this well was relatively stable until July, when it fell about 10 feet due to increased pumping of the well. The water level in Well No. 1 rose about 35 feet from July 2006 until March 2007. After March 2007, the water level had fallen about 60 feet by early August 2007 due to pumping of the well. The water level then rose about 18 feet due to a reduction in pumpage from the well. The water level in Well No. 1 fell 47 feet during June-September, 2008 due to pumpage of the well.

The water level rose 57 feet by July 2009, and then fell about 20 feet by September 2009, due to pumpage of the well. After September 2009, the water level generally rose, when pumpage from the well was minimal. The water level in Well No. 1 rose about 15 feet between October 2010 and April 2011, then fell about 17 feet through August 2011. After August, the water level rose about three feet by the end of September 2011, and remained stable through June 2012. The water level fell 22 feet from June through August 2012 primarily due to pumping of the well, then rose about 17 feet through December 2012. The water level then fell about 20 feet by early April 2013, associated with pumping of this well. The water level then rose about 18 feet by late April 2013, associated with decreased pumping of the well. The water level then remained relatively constant through July 13, 2013, and then fell about 14 feet by the end of the 2013 water year. Between September 2013 and April 2014, the water level in Well No. 1 rose about 47 feet. Between October 2013 and April 2014, the water level in this well was the shallowest of record. After April 2014, the water level fell about 33 feet by the end of the 2014 water year. The water level in Well No. 1 fell about 42 feet during the 2015 water year. Much of the decline was due to pumping from other District wells, in particular Well No. 15. The water level in Well No. 1 rose during the 2016 water level year, associated with minimal pumping from this well. During the 2017 water year, the water level in this well rose about 28 feet through July 2017, then fell about four feet by the end of the water year. During the 2018 water year, the water level rose about three feet. During the 2019 water year the water level fell one foot.

The static water level in Well No. 6 has ranged from less than 30 feet during low pumping periods (after September 1995) to more than 160 feet during heavy pumping periods (August-September, 1994). During May-September, 1996, in part of 1997, and during late 1999 through Fall 2001, the static level in this well was at or above the land surface. This well wasn't pumped during September 1997-September 2001. After pumping of the well resumed in October 2001, the water level fell to about 50 to 70 feet deep through May 2003. The water level then rose more than 49 feet by June 2004. Later in Summer 2004, the water level fell to a depth of about 117 feet, due to increased pumping from the well. In September 2005, depth to water was 44 feet. The well was pumped only a small amount during water year 2006, and the water level had recovered to a depth of about seven feet by March 2006. The water level in Well No. 6 had fallen about 30 feet by July 2007 and another 30 feet by September 2007, primarily due to pumping of this well. The water level in Well No. 6 rose 33 feet between September and November 2007. The water level in Well No. 6 then fell almost 50 feet between November 2007 and September 2008, associated with pumping the well. The water level then rose about 65 feet through June 2009, then fell about 25 feet through September 2009 due to pumping of the well. The water level in Well No. 6 then rose through December 2009, before falling about 25 feet by May 2010. The water level rose 30 feet by June 2010, then fell about 35 feet by September 2010. The water level in Well No. 6 rose 56 feet between October 2010 and July 2011, then fell about two feet through the end of September 2011. The water level was stable from September 2011 through June 2012, and then fell 54 feet by the end of the 2012 water year. This decline was primarily due to pumping of Wells No. 6 and 10. The water level in Well No. 6 rose about 26 feet from November 11, 2012 through early June 2013, associated with decreased pumping. The water level then fell 77 feet through early September 2013. This was associated with increased pumpage from Wells No. 6 and 10 after May 2013. The water level in Well No. 6 rose about 19 feet between September and November of 2013, then was relatively stable through January 2014. The water level then fell about six feet by February 2014. The water level then rose about 13 feet by May 2014. The water level then fell about 44 feet by July 2014, due primarily to pumpage of Wells No. 6 and 10. The water level in July 2014 was the deepest since 1994. The water level in Well No. 6 rose 21 feet by mid December 2014 and then stabilized through early February 2015. The water level then fell about five feet by early March 2015. Water-level measurements could not be made in this well for the rest of the water year, because the sounding tube was inoperative. The water level in Well No. 6 rose during the 2016 water year, associated with little pumping from this well. The water level in this well rose about 84 feet during the 2017 water year, and was stable during the 2018 water year. During the 2019 water year the water level rose one foot.

The static water level in Well No. 10 has ranged from less than 30 feet deep during the low pumping periods (July 1995), to more than 160 feet during heavy pumping periods (Summer 1993). During the 1996-2000 water years, depth to water was usually less than 30 feet, except for short periods. In August 2001, the well began to be pumped more and the water level was usually about 70 to 90 feet deep during the 2002 water year. During Summer 2005, the water level fell to a depth of about 137 feet, near the level in 1994. However, depth to water was 63 feet by late September 2005, following the cessation of summer pumping. During the 2006 water year, the water level rose to a depth ranging from about 10 to 15 feet. This was largely associated with a large reduction in pumping from Wells No. 6 and 10 during 2006. In 2007, the water level in this well fell about 55 feet, primarily due to pumping of the well. The water level in Well

No. 10 rose almost 20 feet during September-November 2007, due to a reduction in pumpage. The water level then fell about 30 feet during November 2007-March 2008. The water level in Well No. 10 rose about 10 feet during March-July, 2008, and then fell almost 30 feet during July-September, 2008. The water-level declines during 2007-08 were associated with pumping of the well. After September 2008, the water level rose about 60 feet through June 2009, and then fell about 10 feet through September 2009. The water level in Well No. 10 then gradually rose through December 2009, then fell more than 30 feet by May 2010. The water level then rose more than 35 feet through June 2010, before falling an equal amount by September 2010. The water level in Well No. 10 rose 68 feet from October 2010 to August 2011, then fell three feet by the end of September 2011. The water level was relatively stable through June 2012, and then fell 66 feet by the end of the 2012 water year. This decline was also primarily due to pumping of Wells No. 6 and 10. The water level in Well No. 10 could not be measured from January 12 through March 13, 2013. The water level is indicated to have risen about 40 feet between October 12, 2012 and early June 2013. The water level then fell about 72 feet by early September 2013, associated with increased pumping of Wells No. 6 and 10. The water level rose about 11 feet from September to November 2013, and then remained stable through January 2014. The water level fell about nine feet by February 2014, and then rose about seven feet by May 2014. The water level in Well No. 10 then fell about 37 feet by the end of the 2014 water year. The water level at the end of the 2014 water year was the deepest since 1993. During the 2015 water year, the water level in this well rose about 12 feet by mid December 2014 and was relatively stable through early February 2015. The water level in Well No. 10 then fell about 17 to 18 feet by the end of the 2015 water year, to the lowest level since 1993. The water level in this well rose about 37 feet during the 2016 water year, due to less pumpage from Wells No. 6 and 10. The water level in Well No. 10 rose about 97 feet through June, then was fairly stable for the rest of the 2017 water year and during the 2018 water year. During the 2019 water year, the water level rose about four feet.

Deep Monitor Wells

Water-level measurements for monitor wells are provided in Appendix C, and supplementary water-level hydrographs are provided in Appendix D. Transducers were installed in four of the deep monitor wells (No. 14M, No. 19, No. 21, and No. 24), and continuous water-level measurements commenced in December 1995. The transducers in Wells No. 19 and 21 were subsequently removed, and installed in Wells No. 26 and 30.

Well No. 5A is located between Well No. 1 and the Valentine Reserve North Spring (Figure 1). Depth to water in Well No. 5A has ranged from near the land surface to about eight feet. The water-level measurements for this well are pressure levels, and are not indicative of unconfined conditions near the land surface. From 1995-99, the annual shallowest level was near the land surface, and overall the water level rose. Seasonal water level declines in this well ranged from about three to four feet during 2000-2002. These declines are indicated to have been due to pumping of Well No. 18 and possibly Well No. 15. The shallowest annual water level in Well No. 5A fell about six feet between 1999 and 2004. However, this level rose to a depth of about 2.5 feet in May 2005, to about 3.0 feet in June 2006, and was near the land surface in July 2007. This was associated with a decrease in pumpage from Well No. 18. The water level in Well No. 5A fell about four feet after July 2007, probably primarily due to pumping of Well No. 18. The water level in Well No. 5A rose two and a half feet during September 2007-July 2008, and then fell two and a half feet during July-September, 2008. The water level rose two and a half feet between October 2008 and June 2009, then fell about two feet by September 2009. The water level in this well was relatively stable through April

2010, then rose about two and a half feet by May 2010. The water level then fell through September 2010. The water level in Well No. 5A fell one foot between October 2010 and January 2011, and then rose five feet through May 2011. The water level then fell four feet by January 2012, and then rose about three feet through May 2012. The water level then fell three feet by the end of September 2012. The water level in Well No. 5A rose about two feet between late October 2012 and early May 2013, and then fell about two and a half feet by the end of the 2013 water year. The water level rose about one foot between September 2013 and February 2014 and then was stable through May 2014. The water level then fell about one foot by the end of the 2014 water year. During the 2015 water year, the water level in this well rose about one foot by mid March 2015, and then fell about one and a half feet by the end of the water year. During 2016 water year, the water level in this well rose about three feet by mid-April 2016, then fell about two feet during the rest of the water year. During the 2017 water year, the water level in Well No. 5A rose about seven feet through May 2017, then fell about four feet by the end of the water year. During the 2018 and 2019 water years, the water level was stable.

Well No. 7 is located in the Sherwin Creek campground, about one and a third miles east of Well No. 6. Measurements for Well No. 7 indicate that depth to water has ranged from 223 to 344 feet. The influence of recharge during 1995 and 2005-06 is apparent. Drawdowns of about 10 to 20 feet during 2000-2003 were apparently due to the pumping of the well itself. This well has been pumped for the Boy's Camp. The shallowest annual level in this well fell about twenty feet between 1998 and 2003. The lower water levels in 2003 are attributed partly to more pumpage from the well than previously. Water levels in this well could not be measured in 2004-05 because of a malfunctioning sounding tube. The shallowest water level of record in Well No. 7 (234 feet) was measured in late July 2006, associated with more recharge. The water level in this well fell about 12 feet during Summer 2007, primarily due to pumpage of the well. The water level in Well No. 7 fell 15 feet between September 2007 and June 2008. The water level then rose almost 10 feet during June, and then fell about 10 feet through the end of August 2008. The water level in Well No. 7 rose two feet in September 2008. The water level fell about ten feet between September 2008 and May 2009, and then rose three feet by June 2009. The water level in Well No. 7 was relatively stable through June 2010, and then rose about 12 feet by August 2010. The water level in the well rose about 19 feet between December 2010 and July 2011, and then fell about 19 feet by October 2011. The water level then the rose three feet through December 2011. The water level then fell one foot through January 2012, and then rose about 14 feet through May 2012. The water level then fell nine feet by the end of September 2012. The water level fell about eight feet between the end of the 2012 water year and mid-February 2013, and then rose about 10 feet by early March 2013. The water level then fell about 17 feet through early June 2013. The water level then rose about eight feet through mid-June 2013. The water level then fell slightly and remained stable through the end of the 2013 water year. The water level in Well No. 7 fell about 20 feet between September 2013 and August 2014. The water level in Well No. 7 fell about nine feet between February and April 2015. The water level in this well fell another four feet by July 2015. In part of June and July, 2015, water levels were significantly deeper. Prior to 2015, the water level in this well had primarily been influenced by recharge from Sherwin Creek. However during 2015, water levels in this well were the deepest of record and were significantly influenced by pumping of the well itself. The opening at the top of well was welded closed and no measurements were available for most of the 2016 and 2017 water years. The water level in Well No. 7 was measured in mid September 2017. The water level at that time was about 102 feet shallower than the last previous measurement in July 2015, and was the shallowest of record at that time. During the 2018 water year, the water level rose to 223 feet, the shallowest of record, in December 2017. The water level then fell about 25 feet by June 2018, then rose about 12 feet by the end of the water year. During the 2019 water year, the water level was stable.

Well No. 11 is located in the meadow area, about one quarter mile south of Well No. 10. The deepest level (51 feet) in Well No. 11 was in May 1993, and the shallowest levels were near the land surface during most of the period between September 1995 and June 2014. Between June 2014 and the end of the 2015 water year, the water level in Well No. 11 fell about 30 feet. The water level fell another 13 feet by mid-May 2016, then rose about five feet by late July 2016 and remained relatively stable for the rest of the water year. During the 2017 water year, the water level in this well fell about four feet through December 2016, then rose about 41 feet by the end of the water year. During the 2018 and 2019 water years the water level was stable. Water levels in this well represent pressure levels, and are not indicative of unconfined deposits near the land surface. The water levels have been the deepest during drought conditions and heavy pumping of Wells No. 6 and 10. The shallowest water levels were during wet years and low or moderate pumping of Wells No. 6 and

10. The water level in this well has been influenced by surface flow, particularly in the Bodle Ditch, which passes through the meadow area.

Well No. 14M is located about two-thirds mile east of Well No. 15. The manual water-level measurements for Well No. 14M (Figure 9) indicate that the depth to water normally ranged from about 350 to 360 feet prior to June 1995. The annual shallowest water level in this well rose between 1994 and 1998 and between 1999 and 2000. These rises were primarily associated with recharge and the reduction in pumping of Wells No. 6 and 10 at those times. The water level in this well fell about 95 feet between July 2000 and January 2002, primarily due to pumping of Wells No. 6 and 10. The water level in this well was relatively stable during 2003-04, and then rose significantly in June 2005, apparently due to recharge. By November 2005, the water level had fallen to near the levels prior to this recharge. Recharge was indicated in 2006, as the water level rose about 55 feet, to the shallowest level of record (223 feet) in July. The water level in Well 14M then fell about 35 feet in 2006-07, associated with pumping of wells in the vicinity. The water level in this well rose about 10 feet after April 2007, and then had fallen about 50 feet by April 2008, associated with this pumping. The water level in this well was relatively stable from May 2008

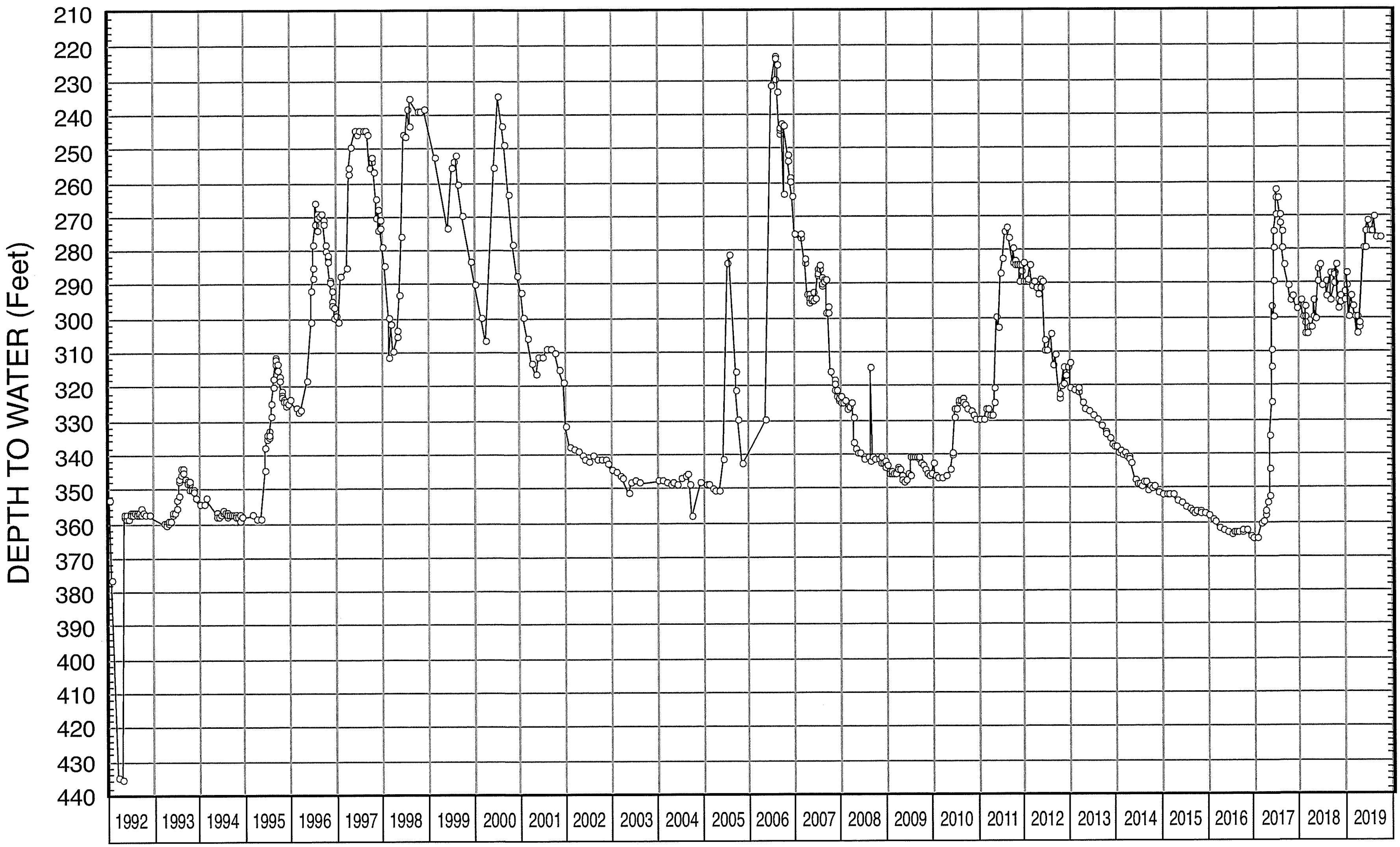

FIGURE 9 - WATER-LEVEL HYDROGRAPH FOR WELL NO. 14M

through May 2010. The water level then rose about 25 feet by August 2010. The water level in this well was relatively stable from October 2010 through April 2011, and then rose 55 feet through August 2011. After August 2011, the water level fell about 51 feet through September 2012. The water level then rose about 11 feet through January 2013, and then fell about 21 feet by the end of the 2013 water year. The water level in this well fell about 16 feet between September 2013 and June 2014, and was then relatively stable for the rest of the 2014 water year. The water level in this well fell about eight feet during the 2015 water year and another six feet during the 2016 water year. During the 2017 water year, the water level in Well 14M fell about two feet through January 2017, then rose about 102 feet by July 2017. The water level then fell about 28 feet by the end of the water year. The water level rose about six feet during the 2018 water year and about 12 feet during the 2019 water year. The water level in this well is influenced by recharge and pumping patterns of Wells No. 6 and 10 and the Snow Creek Golf Course well.

Transducer measurements that are considered reliable are available for Well No. 14M for November 1, 1996-September 30, 2003, except for October 1997, June 1998, and March 2001. The transducer was recalibrated in May 2003, and the 2001-03 measurements agree well with the manual measurements. Reliable transducer measurements are also available from December 14, 2003 through July 31, 2004, December 10, 2004-July 6, 2005, August 12-October 30, 2005, November 30, 2005-May 26, 2006, and August 28, 2007-December 7, 2007. The transducer was recalibrated on April 1, 2007. There was a data logger failure in early September 2007. The transducer was in operation by October 10, 2007. Reliable transducer measurements are available from October 10, 2007 to December 10, 2009. The transducer started malfunctioning on December 10, 2009, and a new transducer was installed as of August 19, 2010. Reliable transducer measurements are available for the rest of the 2010 and for the 2011 through 2019 water years. The transducer was recalibrated on October 9, 2014, and thereafter two or three times per year. A new transducer was installed, calibrated, and activated on August 21, 2019.

Well No. 19 is located about four-fifths of a mile east of Well No. 1. Based on manual measurements (Figure 10), the water level in Well No. 19 has ranged from about 312 to 357 feet deep. The water level in this well generally rose from 1995-98, during a series of wet years. In October 1997, depth to water was 312 feet, or the shallowest of record. During 1999, the water level in Well No. 19 fell about 30 feet, to below the levels in 1994 and early 1995. However, there was no decline during 2000-2004. During this period, depth to water in this well was usually

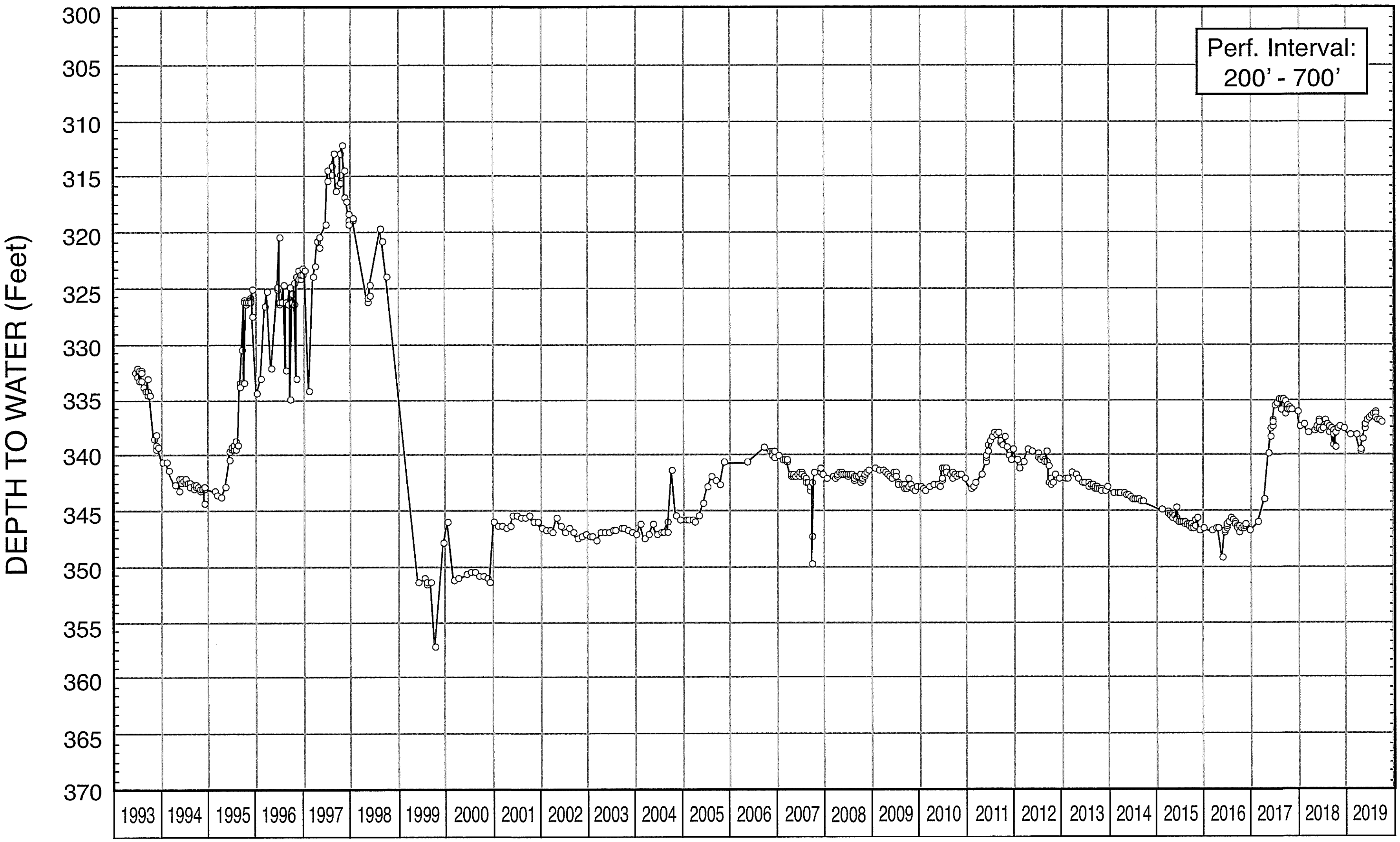

FIGURE 10 - WATER-LEVEL HYDROGRAPH FOR WELL NO. 19

about 340 to 345 feet. The water level in this well slightly rose in 2005 and 2006. From 2006 through March 2011, the water levels in this well were relatively stable. The water level in Well No. 19 rose five feet between March and June 2011, and slightly declined through November 2011. The water level was then stable through August 2012, and then fell three feet through the end of September 2012. The water level rose about a foot through March 2013, and then fell about two feet by the end of the 2013 water year. The water level gradually fell about one foot during the 2014 water year, and fell about three feet during the 2015 water year. The water level in this well was relatively stable during the 2016 water year and through February 2017. The water level then rose about 12 feet by the end of the 2017 water year. During the 2018 water year the water level fell about three feet. During the 2019 water year, the water level rose about one foot. The water level in Well No. 19 has responded primarily to recharge patterns. Transducer readings that are considered fairly reliable are available for this well from November 1, 1996-September 10, 1997, from November 1, 1997-September 30, 1998, except for June 1998, and from May 4-September 30, 2003 (Appendix D). The transducer in this well was recalibrated in May 2003. Reliable transducer measurements are also available from December 4, 2003 through the end of July 2004. The transducer was recalibrated on November 3, 2004 and measurements were reliable for the rest of the 2005 water year. The transducer was recalibrated on April 1, 2007. Reliable transducer measurements are available for October 1, 2005-February 22, 2006 and May 9-November 6, 2007. The transducer in this well was removed on November 6, 2007 and placed in another well.

Well No. 21 is located about three-fourths of a mile east of Well No. 20. Based on manual measurements, the water level in Well No. 21 (Figure 11) has ranged from about 231 to 370 feet in depth. The water level in this well rose significantly between early 1995 and late 1996. There was a water-level decline in this well from December 1996-February 1997, and the water level then rose through June 1997. Most of the rise is attributed to recharge, which was enhanced due to a lack of an annular seal in the well. An annular seal was placed in this well during July 1997. Since July 1997, the water level in this well has slightly risen. The water level rose about three and a half feet during the 2006 water year. In September 2007, the water level in this well temporarily fell about five feet, and then recovered. The water level in this well temporarily fell about four feet during October 2007-September 2008, and then recovered by October 2008. During October 2008-May 2011, the water level

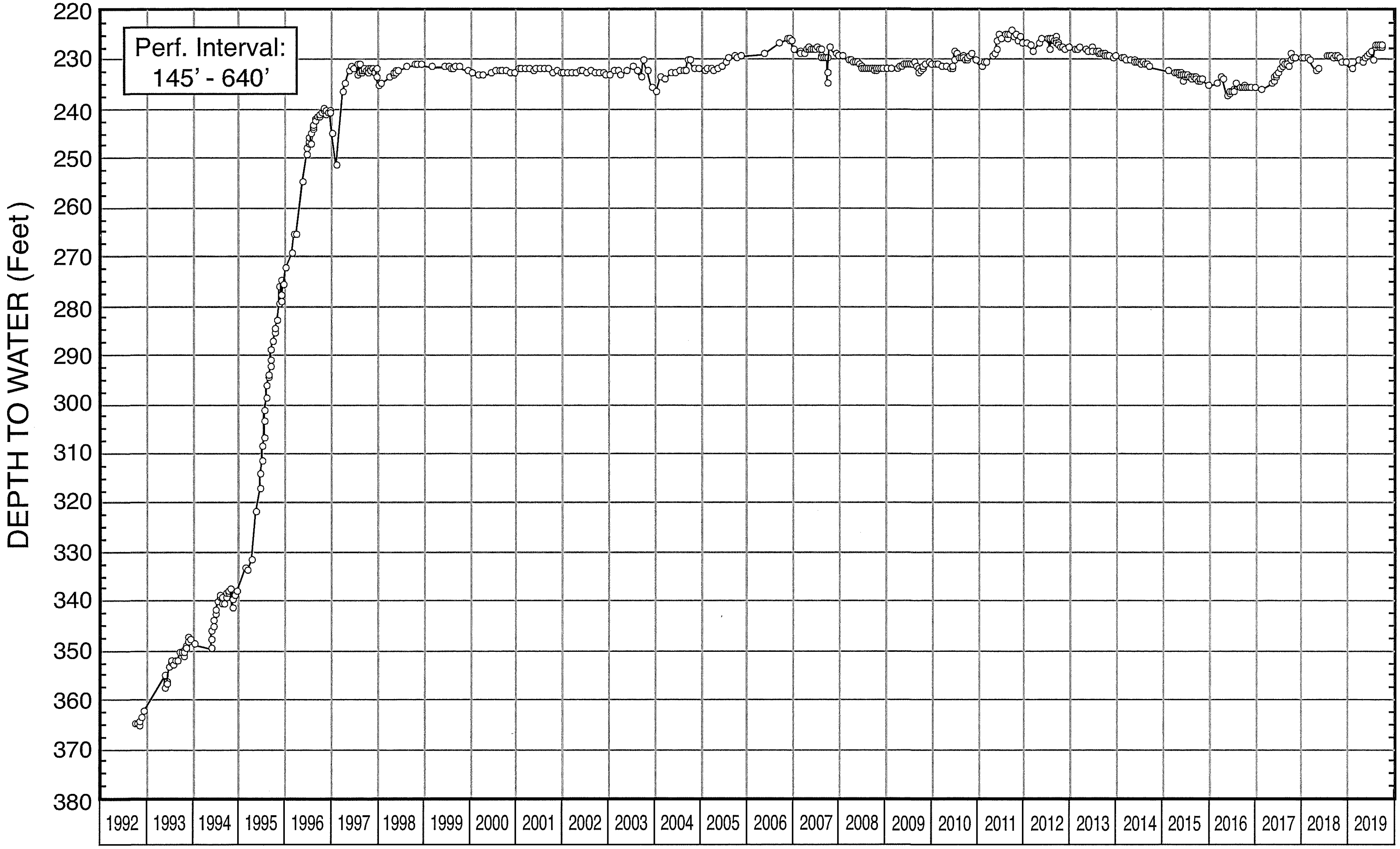

FIGURE 11 - WATER-LEVEL HYDROGRAPH FOR WELL NO. 21

in this well was relatively stable. The water level then rose four feet by June 2011, and then was stable through October 2011. The water level fell three feet through March 2012, then rose three feet through May 2012, and then remained stable through August 2012. The water level then fell two feet by the end of September 2012, and only fell slightly through the end of the 2013 water year. During the 2014 water year, the water level gradually fell about two feet. The water level in this well fell about four feet during the 2015 water year and less than a foot during the 2016 water year. During the 2017 water year the water level in this well was relatively stable through February, then rose six feet by the end of the 2017 water year. During the 2018 water year the water level was stable. During the 2019 water year the water level rose three feet. The water-level measurements in this well have indicated no significant response due to pumping of District wells. Rather, the changes are primarily related to the presence or lack of recharge. Transducer measurements that are considered reliable are available for Well No. 21 from November 1, 1996-May 31, 1997, November 1, 1997-September 30, 1998 (except for June 1998), and May 4, 1999-September 21, 2005 (Appendix D). The transducer in this well was recalibrated in May 2003 and in November 2004. Reliable transducer measurements are available for October 7, 2005-

September 30, 2007. The transducer in this well was removed at the end of September 2007. Because of the small water-level fluctuations that have occurred, manual measurements are adequate.

Well No. 24 is located about one mile east of Well No. 19. Figure 12 is a water-level hydrograph for Well No. 24, based on manual and transducer measurements. Measurements for this well began in Summer 1993, and depth to water has ranged from 352 to 394 feet. The water level rose after early 1995, to the shallowest depth of record (351 feet) in December 1998. The water level fell during 2002-03, and was relatively constant in 2004. After November 2004, the water level in this well rose about nine feet. During the 2006 water year, the water level rose about ten feet. The water level in Well No. 24 rose through May 2007, and then stabilized. The water level in this well fell 25 feet between August 2007 and May 2010. The water level then rose about four feet through July 2010. The water level in Well No. 24 then fell about four feet by October 2010 and then was relatively stable through May 2011. After May 2011, the water level rose about 14 feet through June 2012. The water level was then relatively stable through the end of September 2012. From the end of the 2012 water year to the end of the 2013 water year, the water level fell about six feet. During the 2014 water

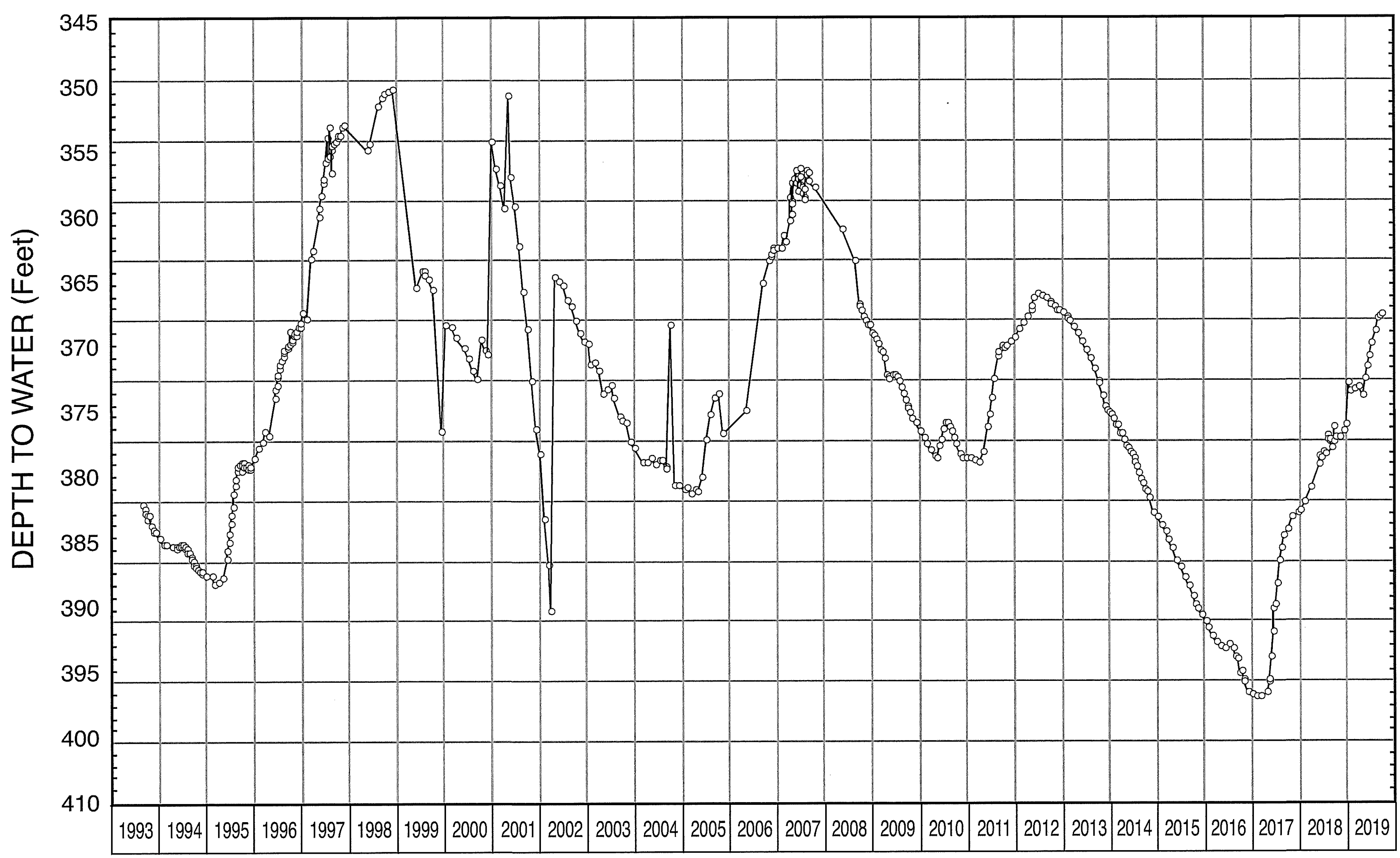

FIGURE 12 - WATER-LEVEL HYDROGRAPH FOR WELL NO. 24

year, the water level fell nine feet. During the 2015 water year, the water level fell another nine feet to the lowest level of record at that time by the end of the water year. The water level in this well fell about six feet during the 2016 water year, to the lowest level of record. During the 2017 water year, the water level in this well fell about two feet through March, then rose 14 feet through the end of the water year. The water level rose another eight feet during the 2018 water year and another ten feet during the 2019 water year. The water level in this well has responded primarily to recharge, and no influence of District pumping is apparent.

Transducer measurements are not available for this well between April 3, 1997 and April 30, 1998, due to equipment failure. The transducer was recalibrated on January 1, 2001. Transducer measurements for this well after this calibration were generally consistent with manual measurements through early October 2001. Transducer measurements between mid October 2001 and early May 2002 were found to not be reliable. The transducer was removed from Well No. 24 and recalibrated on May 9, 2002. Reliable transducer measurements are available for the rest of the 2002 water year through the end of the 2005 water year, and for the 2006 water year. The transducer was recalibrated on April 7, 2006. Reliable transducer measurements for the 2007 water year are available through September 16, 2007. All of the data from the data logger for the 2008 water year were lost by the District. The transducer was recalibrated and reactivated on October 7, 2009, and reliable records are available for the rest of 2009 and for the 2010 through 2017 water years. Reliable transducer measurements for the 2018 water year are available through March 22. A new transducer was installed, calibrated, and activated on September 27, 2018, and reliable transducer measurements are available since that time. A new transducer was installed, calibrated, and activated on August 21, 2019.

A water-level hydrograph for Well No. 26 is provided in Figure 13. This well is located to the east, north of Well No. 24. This well is unusual compared to the other deep District monitor wells, as it taps water producing materials only between depths of 621 and 686 feet. One purpose of the well is to monitor possible effects of geothermal water production in the Basalt Canyon area. The water level in Well No. 26 fell from a depth of 249 feet in June 2006 (the shallowest level of record) to about 256 feet in September 2008. After March 2009, the water level in this well began to fluctuate more and to often be deeper than previously. The deepest water levels prior to 2014 (about 269 feet) were in late 2009 and early 2010. After Janu-

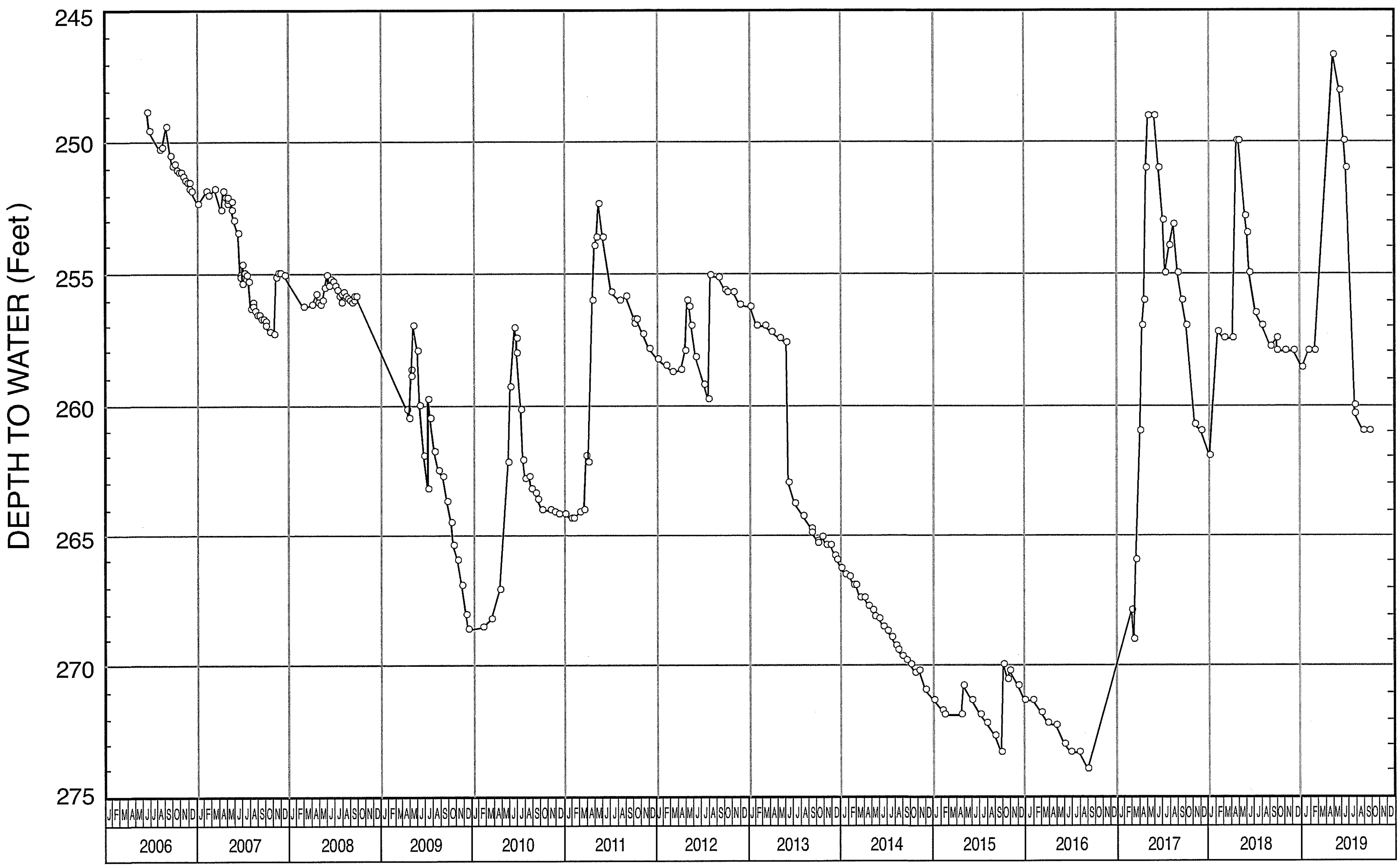

FIGURE 13 - WATER-LEVEL HYDROGRAPH FOR WELL NO. 26

ary 2010, the water level in this well rose about eleven feet by June 2010, and then fell about seven feet by September 2010. The water level in Well No. 26 was stable from October 2010 through March 2011, and then rose about 11 feet through May 2011. The water level then fell about six feet through March 2012, and then rose about three feet through May 2012. The water level then fell about four feet through July 2012. There were no measurements between late July 2012, and late May 2013 due to a transducer failure. The water level then fell about five feet by early June 2013, and then fell about two and a half feet by the end of the 2013 water year. During the 2014 water year, water levels fell an additional five feet. During the 2015 water year, the water level fell about two feet by mid February, and then rose about one foot by early May 2015. The water level then fell about two to three feet by the end of the water year, to the lowest level of record at that time. The water level in Well No. 26 fell another four feet during the 2016 water year, to the lowest level of record. No water-level measurements are available for this well from September 2016 through February 2017. The water level in Well No. 26 rose about 25 feet between August 2016 and May 2017, then fell about eight feet by the end of the 2017 water year. During the 2018 water year the water level fell about five feet. During the 2019 water year, the water level fell about four feet. The water-level changes in this well are indicated to be primarily due to the extent of recharge. However, geothermal water pumpage in the Basalt Canyon area, which started in July 2006, could be responsible for part of the water-level fluctuations. Geothermal water pumping records are available from July 10, 2006 through March 2013. The nearest producing well is 57-25, located about 3,860 feet north of Well No. 26. An average of about 1,900 gpm was produced from this well prior to October 2008. After this, the average production was about 2,600 gpm. Pumping was continuous except for four periods when there was no pumpage (October 8-13, 2008, October 4-9, 2010, November 5-11, 2011, and May 27-June 11, 2012). The other producing Well (66-25) is located about one mile north of Well No. 26. The production from this well averaged about 2,600 gpm. It was not producing during October 4-9, 2010 and March 26-31, 2013. It is inconclusive as to whether or not the water-level trends in Well No. 26 were influenced by the pumping of geothermal water in Basalt Canyon.

Reliable transducer measurements for Well No. 26 are available from December 11, 2006-December 13, 2007. The transducer in this well was removed on December 13, 2007 and reinstalled on April 1, 2008. The transducer was operational from April 1 to 16, 2008, and then was removed for the rest of the water year.

The transducer was reinstalled in April 2009 and was operational through the end of the water year. The transducer started malfunctioning on February 4, 2010 and a new transducer was installed on August 16, 2010. The transducer was removed on July 25, 2012 and reinstalled on July 31, 2012. Reliable measurements are available after August 16, 2010, except for late July 2012 through late May 2013. The transducer was recalibrated in late May 2013. Reliable transducer measurements are available for the 2014 and 2015 water years, except from February 13, 2015 when the transducer was removed and a pump installed, and in April 23, 2015, when the transducer was reinstalled. Reliable transducer measurements are available for the 2016 and 2017 water years, except for September 1, 2016 to March 2, 2017, when the transducer malfunctioned. The transducer was replaced in the well on March 2, 2017. Reliable transducer measurements are available for the 2018 water year. Reliable transducer measurements are available for the 2019 water year, except when the transducer failed on February 21, 2019 and was inoperative through May 7, 2019. A new transducer was installed, calibrated, and activated on May 7, 2019. A new transducer was installed, calibrated, and activated on August 21, 2019. Reliable measurements are thus available after May 7, 2019.

A water-level hydrograph for Well 30 is provided in Figure 14. This well is located east of the Snow Creek Golf Course.

FIGURE 14 - WATER-LEVEL HYDROGRAPH FOR WELL NO. 30

The shallowest level of record (452 feet) was in March 2007. Water levels in Well No. 30 rose 13 feet between June 2006 and May 2007, and then fell 14 feet between October 2007 and September 2009. The water level in this well fell about two feet during October-December, 2010, to the lowest level of record (468 feet) at the end of the period. The water level then rose about ten feet through May 2012, and then fell three feet through the end of September 2012. The water level rose slightly and was relatively stable through early 2013. The water level then fell about 14 feet by the end of the 2013 water year. During the 2014 water year, the water level in this well fell another eight feet. During the 2015 water year, the water level in this well was stable through early March 2015, and then fell about five to six feet by the end of the water year to the deepest level of record at that time. The water level in this well fell another five feet during the 2016 water year. During the 2017 water year, water levels in this well were relatively stable through March 2017, then rose about eleven feet by the end of the 2017 water year. During the 2018 water year, the water level rose about nine feet by the end of June, then slightly fell. During the 2019 water year, the water level rose about seven feet. The water level in this well primarily responds to recharge, and possibly to geothermal pumpage.

A transducer was installed in this well on June 25, 2008 and was operational through the end of the 2009 water year. The transducer malfunctioned in Well No. 30 for the 2010 water year. A new transducer was installed in January 2011, and reliable measurements are available since then. A new transducer was installed, calibrated, and activated on August 21, 2019.

Figure 15 is a water-level hydrograph for SC-1, which taps groundwater in the upper part of the basalt east of the District wells. The water level in this well generally fell from June 1983 through early 1995. However, there were some water-level rises during this period due to recharge. Significant recharge was evident during 1995, 1996, and 1998. The shallowest water levels measured in SC-1 were in June 1983 and late July 1995. In July 1998, depth to water in SC-1 was near that in August 1983. Overall, the water level in this well was relatively stable during 1996-2000. The shallowest annual water level then fell about seven feet between 2000 and 2002, rose slightly in 2003, and fell about five feet in 2004. The shallowest seasonal water level then rose about 18 feet in 2005 and another 13 feet in early 2006. The seasonal low water level also rose between 2005 and 2007. These rises were due to increased recharge. The water level in Well SC-1 rose about three feet during April-July, 2008, and then fell about six feet during July-December,

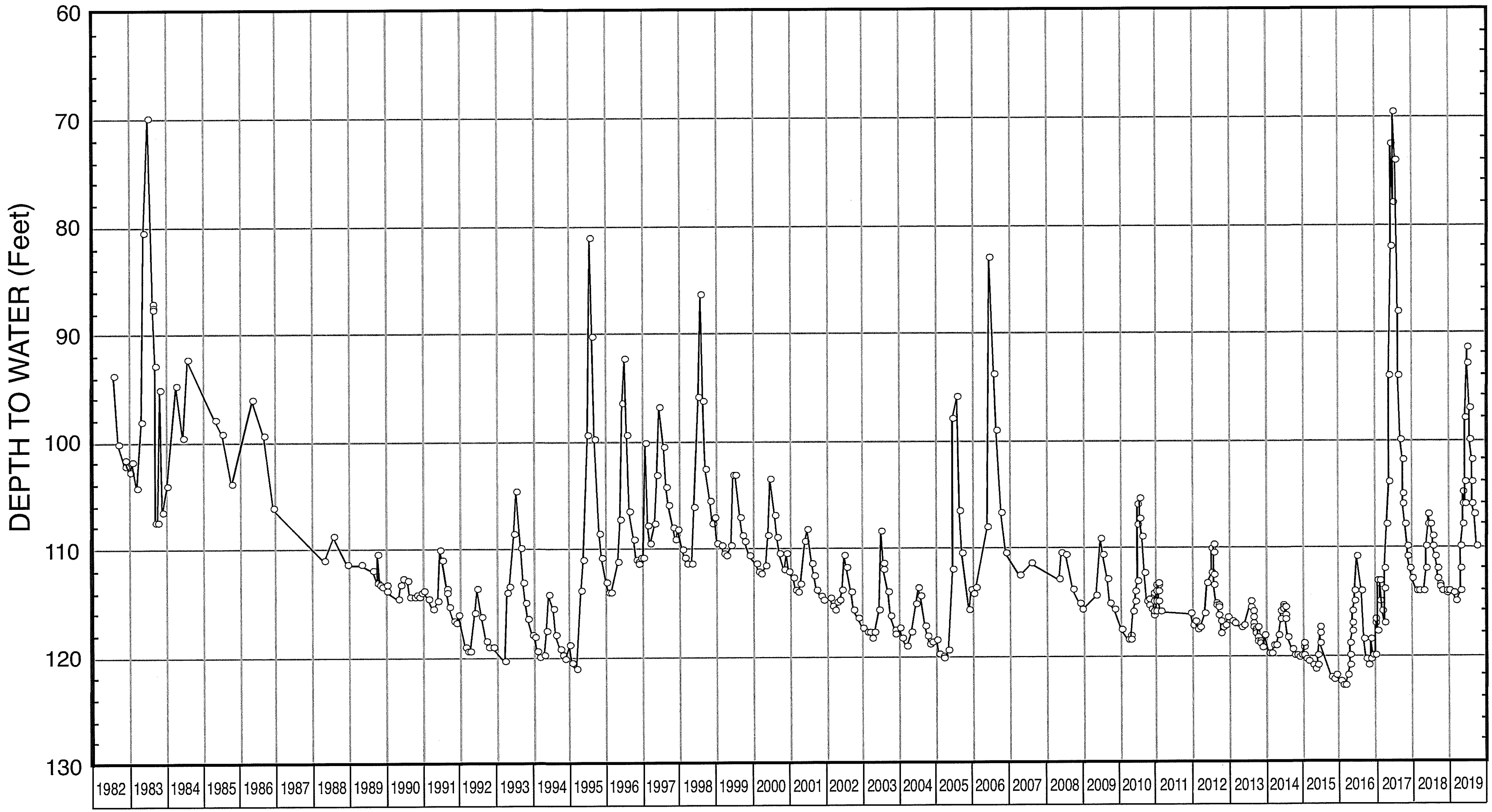

FIGURE 15 - WATER-LEVEL HYDROGRAPH FOR SC-1

2008. The water level then rose about six feet through June 2009 and then fell about ten feet through February 2010. The water level then rose about 12 feet by July 2010, and then fell about 10 feet by September 2010. The water level in SC-1 was relatively stable between October 2010 and January 2011. The U.S. Geological Survey (USGS) discontinued water-level measurements in Wells SC-1 and SC-2 after January 2011. The District resumed water-level measurements in Wells SC-1 and SC-2 in November 2011. The water level in SC-1 fell about two feet from November 2011 through March 2012. The water level then rose about eight feet by late June 2012, and then fell eight feet by the end of September 2012. The water level was relatively stable through May 2013, and then fell about four feet by the end of the 2013 water year. The water level was relatively stable between October 2013 and February 2014. The water level then rose about four feet by June 2014, and then fell about five feet by November 2014. The USGS resumed water-level measurements by installing, calibrating, and activating a transducer on September 2014. Reliable transducer measurements continued through the end of the 2019 water year. The water level then rose about four feet by June 2015. The water level fell another two feet by July 2015, to the lowest levels of record and measurements are not available for the rest of the 2015 water year. The water level in this well fell slightly during the 2016 water year to early April and then rose 12 feet by the end of July 2016. The water level then fell 10 feet by the end of the 2016 water year. The water level was stable at the beginning of the 2017 water year, then slowly rose about 7 feet by the end of March 2017. The water level rapidly rose an additional 44 feet through the end of June 2017, and was the shallowest water-level on record. The water level then rapidly fell about 36 feet by the end of the 2017 water year. During the 2018 water year the water level fell about nine feet. During the 2019 water year, the water level rose about three feet.

Figure 16 is a water-level hydrograph for SC-2, which taps groundwater in the deeper basalt near SC-1. Comparison of the hydrographs for SC-1 and SC-2 indicates that water levels in the two wells fluctuate similarly. However, the water-level rises are less in the deeper monitor well than in the shallower monitor well, as would be expected if the rises are mainly due to recharge from the land surface. The water level in SC-2 was about 156 feet deep in June 2004, or about the same as in June 1995. The water level in SC-2 generally rose during 1995-98, was relatively stable during 1999-2000, and fell about 29 feet from June 2000-March 2005. The water level in this well rose about seven feet between March and July of 2005, and then fell

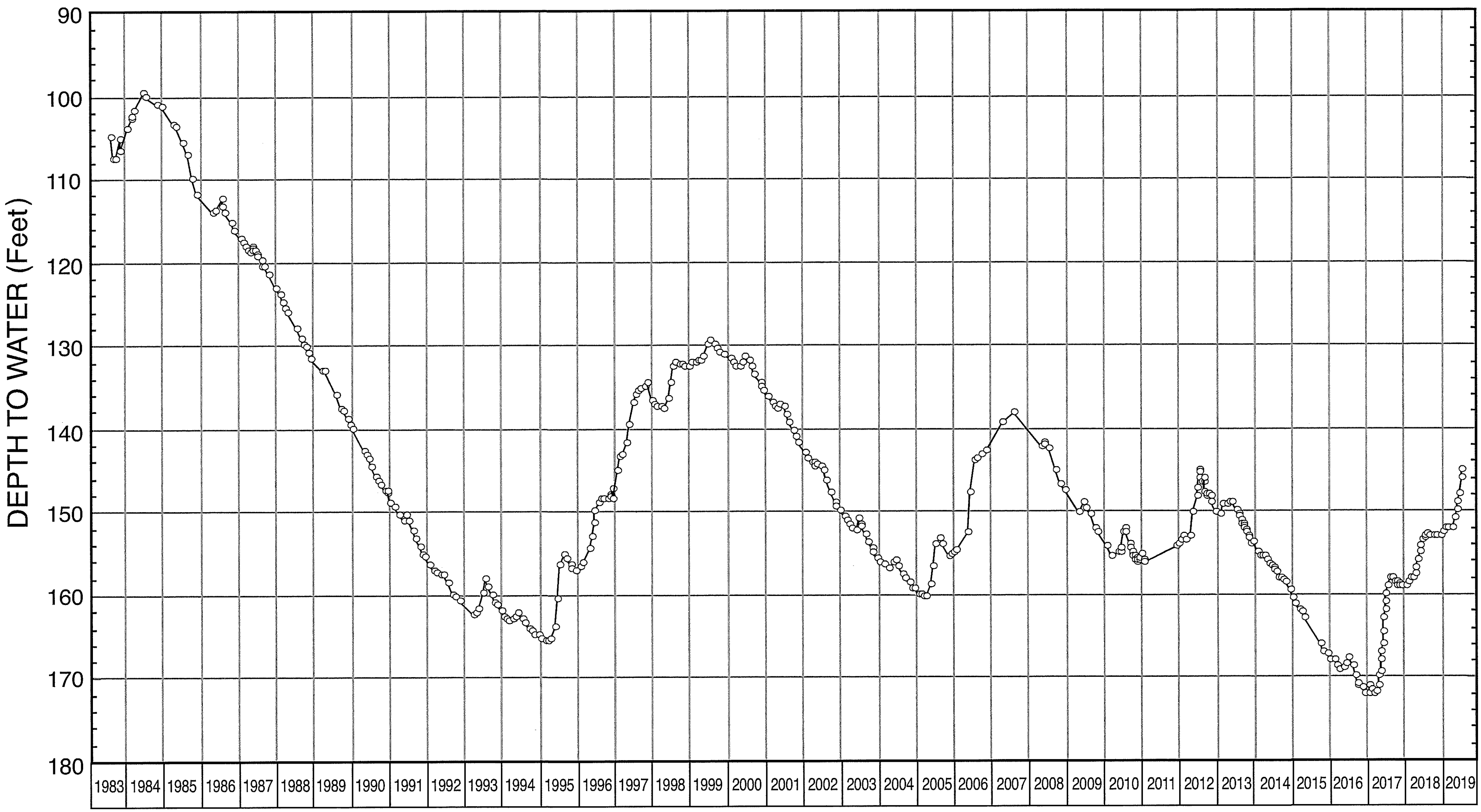

FIGURE 16 - WATER-LEVEL HYDROGRAPH FOR SC-2

about four feet by November 2005. The water level rose about 18 feet by July 2007. The water level in this well fell about 12 feet during October 2007-May 2009. The water level then rose two feet by June 2009 and then fell seven feet by March 2010. The water level then rose about four feet by July 2010, and then fell about four feet by September 2010. The water level in SC-2 was relatively stable during October 2010-January 2011, after which measurements were temporarily discontinued. Measurements in SC-2 were restarted in November 2011 and the water level rose four feet between January 2011 and April 2012, and then rose eight feet by July 2012. The water level then fell about three feet by the end of September 2012. The water level fell slightly through November 2012, and was relatively stable through June 2013. The water level then fell about four feet by the end of the 2013 water year. The water level fell about 12 feet between September 2013 and June 2015. During the 2016 water year the water level in this well fell about three feet to the lowest level of record. During the 2017 water year the water level was stable through the end of March 2017. The water level then rapidly rose 14 feet by early August 2017 and then remained stable through the end of the 2017 water year. During the 2018 water year the water level rose 14 feet. During the 2019 water year, the water level was stable through early December 2018, then rose 8 feet by early July 2019. The transducer then failed and no water-level measurements were made from July 8 to the end of the water year. Water-level variations in SC-1 and SC-2 are indicated to be due to climatic variations and possibly other factors, such as geothermal water pumping at Casa Diablo, and have not been due to District well pumpage. This conclusion is primarily based on the water-level hydrographs for the easterly District wells and water-level elevation data (Figures 2 and 21).

In summary, the only deep wells that had declining water levels during the 2019 water year were Wells No. 1, 25, and 26. The declines were two feet or less, except for Well No. 26, where the water level fell four feet. Water levels were stable in Wells No. 7 and 11, and rose in the other deep wells.

Shallow Monitor Wells

A water-level hydrograph for Well No. 22 is provided in Figure 17. Pumpage of nearby Well No. 15 is also plotted on this figure. The water level in Well No. 22 is not related to pumpage of Well No. 15, which taps groundwater in the deeper consolidated rock. The water level in Well No. 22 responds primarily to recharge from Mammoth Creek streamflow (Figure 18). Well No. 22 was dry until June 17, 1993 and during 1994-early 1995. The

FIGURE 17-WATER-LEVEL HYDROGRAPH FOR WELL NO. 22 AND PUMPAGE
FOR WELL NO. 15

FIGURE 18-WATER-LEVEL HYDROGRAPH FOR WELL NO. 22 AND MAMMOTH CREEK STREAMFLOW

shallowest water level of record in Well No. 22 (71 feet) was in August 1995. Depth to water in this well rose about 12 feet during May-July, 1995, due to recharge corresponding to high flows (exceeding 40 cfs) in Mammoth Creek. During 1996-2007, the water-level trends in Well No. 22 also followed the pattern of streamflow in Mammoth Creek. Well No. 22 was dry during early 2004 and late 2004 and early 2005. This was associated with low streamflow during or prior to those periods. During July-November, 2006, the water level in Well No. 22 was the shallowest since 1997. Well No. 22 was dry in August 2007 and from January 2008 to June 2010. The temporary water-level rise in October 2007 was due to the District adding water to the well on September 30, 2007 in an attempt to redevelop it prior to a subsequent pump test. Water levels in Well No. 22 were frequently measured during a two-week pump test on Well No. 15 during October 24-November 7, 2007. Measurements indicated no influence of pumping Well No. 15 on water levels in Well No. 22 (KDSA, 2008). The water level rose almost five feet by June 2010, and then fell about four feet by September 2010. The water level rose three feet during October-November, 2010, and then fell about four feet during November 2010-February 2011. The well was dry through May 2011. The water level then rose at least 11 feet through June 2011. The water level fell about two feet in August 2011, and then rose two feet by October 2011. The water level then fell eight feet through February 2012, and then rose more than five feet through June 2012. The water level then fell about five feet by the end of September 2012. The water level in Well No. 22 was relatively stable through March 2013, and then fell about three feet by the end of August 2013. The well was then dry for the rest of the 2013 water year and for the 2014 and 2015 water years. In February 2016 the water level was about 50 feet deep. The water level gradually fell through July 2016 and the well was dry for the rest of the water year. The water level in Well No. 22 rose eleven feet during the 2017 water year and about two feet during the 2018 water year. During the 2019 water year, the water level fell about two feet.

Water-level hydrographs based primarily on manual measurements for Well No. 23 and pumpage for nearby Well No. 1 are shown in Figure 19. Depth to water in Well No. 23 has ranged from about 5 to 18 feet during the period of record. The shallowest water levels were in 1993, 1995, 2005, 2006, 2010, and 2011. Depth to water in this well is not influenced by pumpage of Well No. 1, which taps groundwater in the deeper consolidated rock. Well No. 23 is located relatively close to Mammoth Creek and is clearly influenced by recharge from streamflow (Figure 20),

FIGURE 19-WATER-LEVEL HYDROGRAPH FOR WELL NO. 23 AND PUMPAGE FOR WELL NO. 1

FIGURE 20-WATER-LEVEL HYDROGRAPH FOR WELL NO. 23 AND MAMMOTH CREEK STREAMFLOW

and possibly from other local sources of recharge. The deepest water levels in Well No. 23 were during late 2010 and early 2011, late 2011 and early 2012, late 2013 and early 2014, in late 2014, and in early 2015. During early 2012 and early 2015, the levels were the deepest of record. During the 2016 water year, the water level generally rose through June 2016, then fell, and overall there was little change. During the 2017 water year, then there was a water level rise in this well of nine feet by April 2017, then water levels fell about four feet by the end of August 2017. The water levels then rose about three feet by the end of the 2017 water year. The water level fell about six feet during the 2018 water year. During the 2019 water year, the water level was stable.

On August 1, 1996, a float-type continuous water-level recorder was installed in Well No. 23. Some problems were experienced with this recorder, but reliable measurements were obtained during most of 1997-2005. Transducer measurements are not available for the 2006 water year. Reliable transducer records for Well No. 23 are available from May 2007-March 26, 2008. The transducer was non-operational from March 26-May 13, 2008. Reliable transducer records are available for the rest of the 2008 water year, and for the 2009-2019 water years, except between October 2014 through February 2015, when the transducer was temporarily removed, and from April 18 through May 7, 2017 and June 20 through July 7, 2017, when the transducer malfunctioned.

Water-level hydrographs for the remaining shallow monitor wells are provided in Appendix D. Well No. 4M is located in the meadow area east of District Wells No. 6 and 10. The water level in Well No. 4M rose significantly between early 1995 and early 1998, due to significant surface water flow in the meadow. In May 1998, the water levels in this well were the shallowest since 1988. The annual shallowest water level in this well fell about 20 feet between 1998 and 2004. In 2004, depth to water in this well was about the same as in 1989. However, in 2005, the shallowest annual water level was 24 feet deep, shallower than in 2004, and near the shallowest level in 2001. During May-June 2006, the water level was about 14 feet deep, the shallowest of record. After June 2007, the water level in Well No. 4M fell to a depth of about 40 feet by March 2008. The water level rose five feet during March-May 2008, and then fell three feet by the end of September 2008. The water level rose five feet through July 2009, then fell about four feet by January 2010. The water level then rose about eight and a half feet by June 2010. The water level then fell about five and a half feet by November

2010, and then rose 19 feet through May 2011. The water level then fell about 16 feet through February 2012, and then rose about seven feet by June 2012. The water level then fell about four feet by the end of September 2012. The water level then fell another eight feet by the end of the 2013 water year. Between September 2013 and April 2014, the water level fell about five feet. The water level in Well No. 4M was then stable through the end of the water year. These stable levels were the deepest levels in Well No. 4M since 2005. During the 2015 water year, the water level fell about four feet by mid July 2015, and was then stable for the rest of the water year. These stable levels were the deepest since 2004. The water level in this well rose during March-June, 2016 by about five and a half feet, then fell about two feet by July 2016, and was stable for the rest of the water year. During the 2017 water year the water level in Well 4M rose about 32 feet by May, and then fell about six feet by the end of the water year. During the 2018 water year the water level was almost stable. During the 2019 water year, the water level rose about two feet. Depth to water fluctuations in this well have followed patterns of Bodle Ditch flows, rising during periods when flows were present in the ditch, and falling when there were no flows.

Well No. 5M is located about one-half mile east of Well No. 1.

Well No. 5M taps the shallow volcanic rock, and no water was observed in the overlying glacial till at the time of drilling of this well. Depth to water in Well No. 5M has ranged from about 2.5 to 9.5 feet. The shallowest levels have been in the spring and early summer, and the deepest in the summer. The annual shallowest water level in this well fell about four feet between 1998 and 2004, due to decreased recharge. The annual shallowest water level rose about four feet in 2005, then fell about half a foot in 2006. By July 2007, the water level in this well was at the land surface. The water level then fell to about four feet deep by September 2007. The water level rose four feet during October 2007-May 2008, and then fell four feet during May-September 2008. The water level rose five feet through May 2009, and then fell four and a half feet through the end of September 2009. The water level rose gradually through March 2010, and then rose about five and a half feet by May 2010. The water level then fell about 2.7 feet by September 2010, and rose about five feet during October 2010-May 2011. The water level then fell about five feet through the end of September 2011. The water level in Well 5M rose two feet through May 2012, and then fell about two feet through the end of September 2012. The water level then rose more than two feet by April 2013, and then fell almost three feet by September 2013. The transducer in this well was not operative from October 2013 through May 2014. Between June 2014 and the end of the 2014 water year, the water level fell about one foot. During the 2015 water year, the water level in Well No. 5M rose about one foot by mid February, and then fell about one and a half feet by the end of the water year. During the 2016 water year, the water level in this well rose about four feet through April 2016, then fell about three feet by the end of the water year. During the 2017 water year, the water level in Well 5M rose about five and a half feet through early May 2017, then fell about five feet by the end of the 2017 water year. The water level was relatively stable during the 2018 and 2019 water years. The water-level changes in this well have been due to the presence or absence of recharge.

Reliable transducer measurements for this well are available from October 2008 through September 2013, after May 29, 2014, 2015, 2016, and 2017 water years. Reliable transducer measurements for the 2018 water year are available through May 24, 2018. On September 28, 2018 a new transducer was installed, calibrated, and activated, and reliable transducer measurements are available since that time. A new transducer was installed, calibrated, and activated on September 21, 2019.

Well No. 10M was dry from October 1992 through June 10, 1993. Some water appeared in this well during June 17-August 19, 1993, and during June 6-June 20, 1996. The well was otherwise dry from late 1992 through December 4, 1996. During 1998-mid 2001, there was water in Well No. 10M most of the time. This well is adjacent to District Well No. 10, and the water level in Well No. 10M is primarily influenced by pumping of this well and also by local recharge. The influence of pumping of nearby Well No. 10 was demonstrated by an aquifer test when the well was newly developed. This influence on shallow groundwater is in contrast to that observed near District Well No. 15, where no such influence has been demonstrated. Well No. 10M was dry from July 2001 to Spring 2006, due to increased pumping from Well No. 10 during 2001-05. The water level in Well No. 10M then rose to the shallowest level of record (about 10 feet) by May 2006. After May 2006, the water level in this well fell, and the well became dry by June 2007. The well was dry during June 2007-January 2011. The water level rose at least 18 feet through May 2011, and then fell 13 feet through July 2011. The water level then rose five feet through September 2011. The water level then fell about seven feet, and the well became dry from January to April 2012. The water level rose about nine feet through June 2012, and then fell during the rest of the water year until the well became dry. The well remained dry during the 2014, 2015, and 2016 water years. During the 2017 water year, Well No. 10M was dry through early March 2017. The water level then rose at least 16 feet by early May 2017. The water level in this well then fell seven and a half feet by late June 2017, then rose four feet by the end of the 2017 water year. The water level fell about four feet during the 2018 water year. During the 2019 water year, the water level rose five feet.

Well No. 11M is located in the southwest part of the meadow area near the Bodle Ditch. Water levels in this well have had seasonal fluctuations that corresponded to flows in the ditch. The shallowest water levels have generally been in June-July. Water levels gradually declined during 1989-92, but rose significantly after 1992. The water level began to rise significantly in April 1996, and the shallowest level yet measured (about four feet deep) was in June 1996. The shallowest annual water level for Well No. 11M fell about nine feet between 1998 and 2001, due to decreased recharge. However, the shallowest water level in this well in 2002 was higher than in 2001, and near the shallowest level in 2000. The shallowest water level in Well 11M was about two and a half feet higher in 2004 than in 2003. The shallowest water level in this well was relatively constant from 2002-04. In 2005 and 2006, the shallowest water levels were about five feet deep, near the shallowest of record. After June 2006, the water level in Well No. 11M fell to a depth of 28 feet in September 2007. The water level fell one foot during September 2007-March 2008, and then rose 13 feet during March-July, 2008. The water level then fell six feet during July-September, 2008. The water level gradually rose eight feet through June 2009, and then rose ten feet by July 2009. The water level then fell 14 feet through November 2009. The water level then rose about 17 feet through June 2010. The water level then fell about 12 feet by September 2010. The water level in this well then rose 10 feet through June 2011, and then fell about 16 feet through April 2012. The water level in Well 11M then rose about nine feet through June 2012, and then fell more than 13 feet through the end of September 2012. The water level then fell slightly through March 2013, and then rose about eight feet by the end of June 2013. The water level then fell about eight feet through the end of the 2013 water year. Between September 2013 and February 2014, the water level fell about four feet. The water level was then stable through May 2014, and then fell three feet by the end of the 2014 water year. During the 2015 water year, the water level fell about four feet to the lowest level of record. The well was dry from December 2015-March 2016. The water level in this well rose about 22 feet by July 2016, and fell about eight feet by August 2016. No water-level measurements are available for this well from mid August 2016 through the end of November 2016, the water level in Well 11M rose about 27 feet, by early August 2017. No measurements were available for September 2017. The water level fell about eight feet during the 2018 water year. During the 2019 water year, the water level rose seven feet.

A transducer was installed in this well for the first time in May 9, 2012 and reliable transducer records are available through mid-August 2016, when the transducer malfunctioned. A new transducer was installed, calibrated, and activated on November 14, 2017 and reliable transducer measurements are available through January 15, 2019. A new transducer was installed, recalibrated, and activated on August 22, 2019 and reliable measurements are available since then. Long-term water-level fluctuations in Well No. 11M are related to wet and dry cycles and the associated recharge.

Well No. 12M is located in the western part of the meadow area. The water level in this well has responded significantly to a number of recharge events. The water level in this well began to rise significantly in April 1996, and reached the shallowest level of record (4.5 feet) in June 1996. The shallowest water level in Well No. 12M fell about nine feet between 1998 and 2004. However, the water level in this well rose about seven feet in 2005, and rose another foot in 2007. After June

2006, the water level in this well fell, and by August 2007 the well was dry. The water level in this well rose after December 2007, and by June 2008 had risen about seven feet. The water level rose about one foot by mid-August 2008. The well was dry from September 2008 through June 2009. The water level then rose 21 feet through July 2009, and then fell about 16 feet through November 2009. The water level then rose about 17 feet by June 2010. The water level then fell about 12 feet through February 2011. The water level in Well No. 12M then rose 12 feet through June 2011, and then fell about 11 feet through May 2012. The water level then rose nine feet through June 2012, and then fell eight feet by the end of July 2012. The top of the well was vandalized and no records are available for the 2013-2016 water years. During the 2017 water year Well 12M was dry through early May 2017, then the water level rose at least about 25 feet by the end of the water year. The water level fell about 21 feet during the 2018 water year. At the beginning of the 2019 water year the well was dry. The water level rose at least 20 feet by the end of the water year. The long-term water-level trends for this well are due to recharge.

Water-level hydrographs for Wells No. 27, 28, and 29 are provided in Appendix D. Well No. 27 is located east of Well No.

20. Depth to water in Well No. 27 has ranged from about 32 to 87 feet. The water level has risen in the spring and fallen during the summer and fall. The water level was about 48 to 50 feet deep from September 2009 to April 2010, and then rose to 32 feet in June 2010. The water level fell about four feet during October-December, 2010, and then rose about 21 feet to the shallowest level of record (28 feet) by May 2011. The water level then fell about 20 feet through March 2012, and then rose about seven feet through May 2012. The water level then fell about nine feet through the end of September 2012. The water level fell about five feet through November 2012, and then was relatively stable through February 2013. The water level then rose about 14 feet by April 2013, and then fell about 15 feet by the end of the 2013 water year. During the 2014 water year, the water level in Well No. 27 fell about 16 feet. During the 2015 water year, the water level fell another 17 feet, to the deepest level of record. Overall, the water level in this well rose during 2007-2011 and fell during 2012-15. During the 2016 water year the well was dry until late February, then the water level rose about 35 feet through early August. The water level then fell about six feet by the end of the water year. During the 2017 water year the water level in Well No. 27 fell about three

feet by the end of October 2016, then rose about 38 feet by May 2017. The water level then fell ten feet by June 2017. No measurements were available from June 2017 until November 3, 2017 due to a transducer malfunction. The water level fell about four feet during the 2018 water year. During the 2019 water year, the water level rose three feet. Recharge appears to be the primary influence on water levels in this well.

A transducer was installed in Well No. 27 in February 2011, and reliable measurements were available until June 23, 2017. The transducer was repaired and re-calibrated on November 3, 2017 and reliable transducer measurements are available since then. A new transducer was installed, calibrated, and activated in August 22, 2019.

Well No. 28 is located south of the Old Mammoth Road stream gage and is equipped with a transducer. Depth to water in Well No. 28 has ranged from about 24 to 81 feet. The shallowest level of record was in July 2006. The water level in this well fell between August 2006 and March 2009. The water level then rose about four feet by August 2009. The water level then fell about seven feet to the lowest level of record (85 feet) by April 2010. After May 2010, the water level rose about 20 feet by September 2010. The water level in this well fell seven feet between October 2010 and April 2011. The water level in Well No. 28 rose 45 feet during April-June, 2011 to a depth of 27 feet, then fell 30 feet by the end of September 2012. The water level in this well fell another 20 feet by the end of the 2013 water year. The water level in Well No. 28 fell about nine feet between September 2013 and May 2014. The well was dry from May 2014 through March 2017. The water level then rose 59 feet by July 2017, and then fell seven feet by the end of the 2017 water year. Records were incomplete during the 2018 water year to determine the overall change in water level. During the 2019 water year, the water level rose about 13 feet. The water-level changes in this well have been due to the amounts of recharge.

Reliable transducer records are available from February 2007 to October 2010, February to September, 2011, and for the 2012, 2013, 2014, and 2017 water years. For the 2018 water year, reliable transducer measurements are available through May 24, 2018 when the transducer failed. The transducer was repaired and re-calibrated on September 28, 2018 and reliable transducer measurements are available since then. A new transducer was installed, calibrated, and activated on August 22, 2019.

Well No. 29 is located about a thousand feet east of Well No. 28. Depth to water in Well No. 29 has ranged from 63 feet to 98 feet. The shallowest level of record was in September 2006. The water level in this well rose about 11 feet during June-October, 2007, and then fell about 35 feet through March 2010, to the lowest level of record (98 feet). The water level then rose about six feet through September 2010. The water level in Well No. 29 fell two feet during October 2010-February 2011, and then rose 23 feet through September 2011. The water level then fell about 11 feet through March 2012, and then rose about seven feet through May 2012. The water level then fell five feet by the end of September 2012. The water level fell about 12 feet during the 2013 water year. The water level in this well fell about four feet between September 2013 and February 2014, and the well was dry through early May 2017. The water level then rose at least about 40 feet by early September 2017 and was stable for the rest of the 2017 water year. The water level fell about 15 feet during the 2018 water year. During the 2019 water year, the water level rose about four feet. The water-level changes in this well are due to the amounts of recharge. In summary, the water levels in most of the shallow monitor wells have generally risen during wet periods and fallen during dry periods. This is due to varying amounts of recharge during these periods.

Water-Level Elevation Contours

Figure 21 shows water-level elevation contours for late September 2019. The hydrologic boundary is shown north of Wells No. 1 and 5A and south of Wells No. 16 and 25. This boundary is believed to be present only west of a line connecting Wells No. 14M and 21. A cone of depression was evident due to pumping of District Wells No. 6, 10, 15, 17, 20, and 25. This cone of depression did not extend east of Well No. 19. The overall direction of groundwater flow in late September 2019 was similar to that shown in the previous annual reports. This map shows only the horizontal component of groundwater flow in the basalt and interbedded glacial till. Other evidence (i.e., water levels in SC-1 and SC-2) indicates that there is also significant downward flow of groundwater in most of the area.

CHEMICAL QUALITY AND TEMPERATURE OF GROUNDWATER

The results of chemical analyses and temperatures of water for the supply wells during the 2019 water year are provided in Appendix E. Water samples have generally been collected monthly from the active supply wells since November 2006. The monitor wells were not sampled during the 2007-19 water years. Transducers are installed in a number of the deep monitor wells to

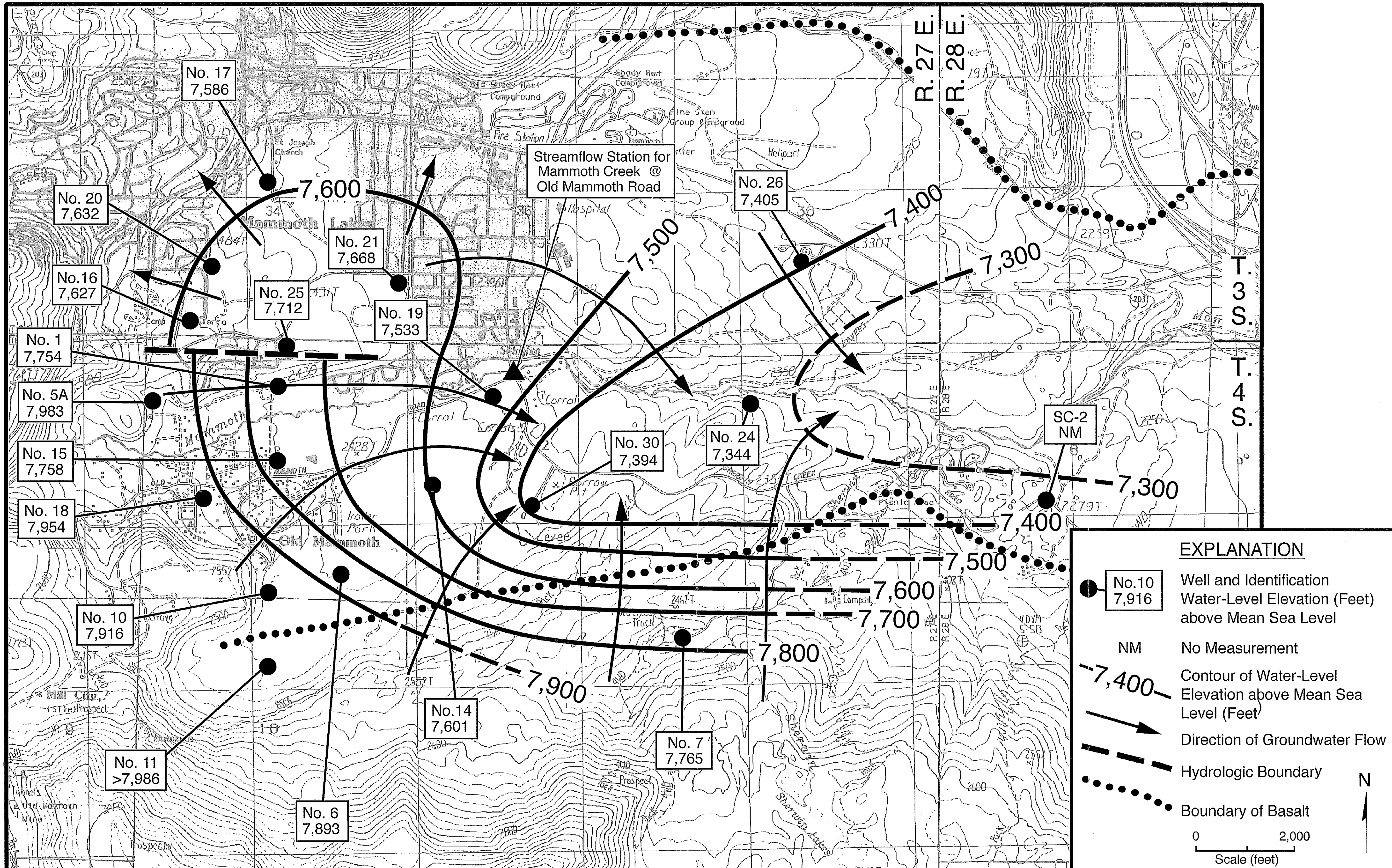

FIGURE 21 - WATER-LEVEL ELEVATIONS IN LATE SEPTEMBER 2019

continuously measure water levels. Because of these transducers, it was not feasible to collect water samples from these wells during 2007-19 water years. The coldest water (55°F or less) has normally been from shallow monitor wells in the meadow area and in water from the supply wells tapping consolidated rock, south of the hydrologic boundary. In contrast, the warmest water (60°F or greater) has been from some of the wells tapping consolidated rock north of the hydrologic boundary (ie, Wells No. 16 and 17), closer to the known area of relatively shallow geothermal water in Mammoth Lakes, and from Well No. 18 (south of this boundary). The lowest electrical conductivity values (less than 200 micromhos per centimeter at 25°C) have normally been for shallow monitor wells and Wells No. 7 and 11. The highest values (greater than 430 micromhos) have been for wells tapping the consolidated rock in the western part of the area.

The highest temperature of record for Well No. 20 was in September 2015. Water from Wells No. 16, 17, 18, and 20 showed an overall decrease in pH during 1996-2009. These are the westernmost District supply wells. Low pH groundwater is known to be present beneath parts of Mammoth Mountain. During 2011-19, the pH values in water from these wells usually ranged from about 6.4 to 7.4, similar to the range in the late 1990's.

MAMMOTH CREEK STREAMFLOW

Records of streamflow at the outlet from Twin Lakes and the Old Mammoth Road crossing during the 2019 water year are provided in Appendix F. The mean monthly flow at the Old Mammoth Road crossing ranged from 7.1 cfs in October 2018 to 130 cfs in June 2019. The maximum daily flow was 202 cfs in mid-June 2019.

Average daily flows for the upstream (Twin Lakes) and downstream (Old Mammoth Road) stations during the 2019 water year are plotted in Appendix F. Previous evaluations of periodic downstream decreases in streamflow during the 2013 to 2018 water years indicated that District pumpage did not cause these decreases.

During the 2019 water year the streamflow at the Old Mammoth Road Crossing was less than at the Twin Lakes Outlet during December 2018-March 2019, and mid-August-early September 2019 (Figure 22 and 23). However, there was no correlation between District pumpage and the differences in streamflow, and District pumping was minimal (normally less than 1 cfs) during these periods.

Thus for the historical data, there was no correlation between District pumpage and the downstream decreases in streamflow. One likely reason for the downstream decreases in streamflow is less groundwater inflow to Mammoth Creek due to drought conditions, which results in lower groundwater levels to the

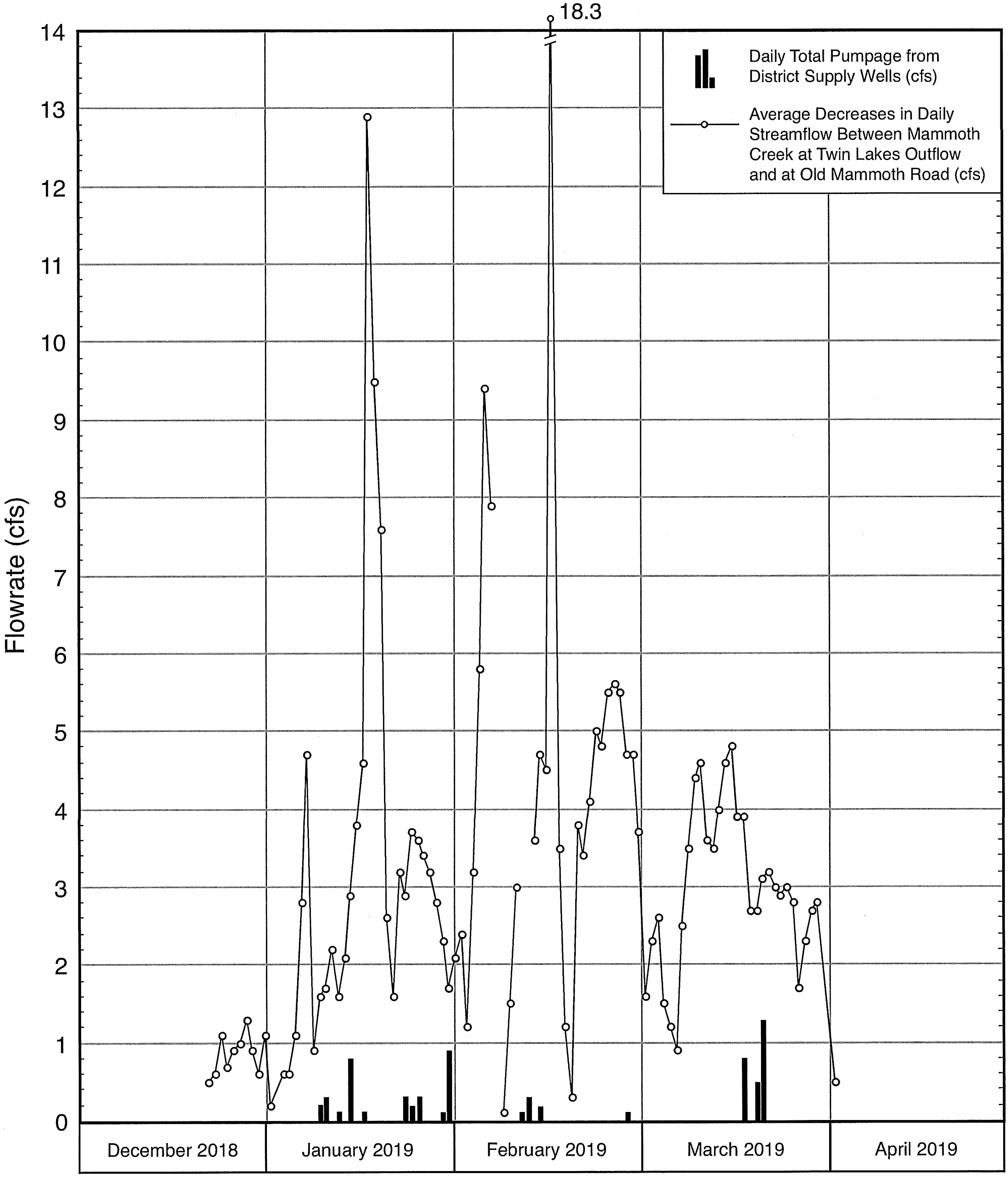

FIGURE 22 - RELATIONSHIP BETWEEN DIFFERENCE IN MAMMOTH CREEK STREAMFLOW AT TWIN LAKES OUTFLOW AND OLD MAMMOTH ROAD AND DISTRICT SUPPLY WELL PUMPAGE (DECEMBER 2018 - APRIL 2019)

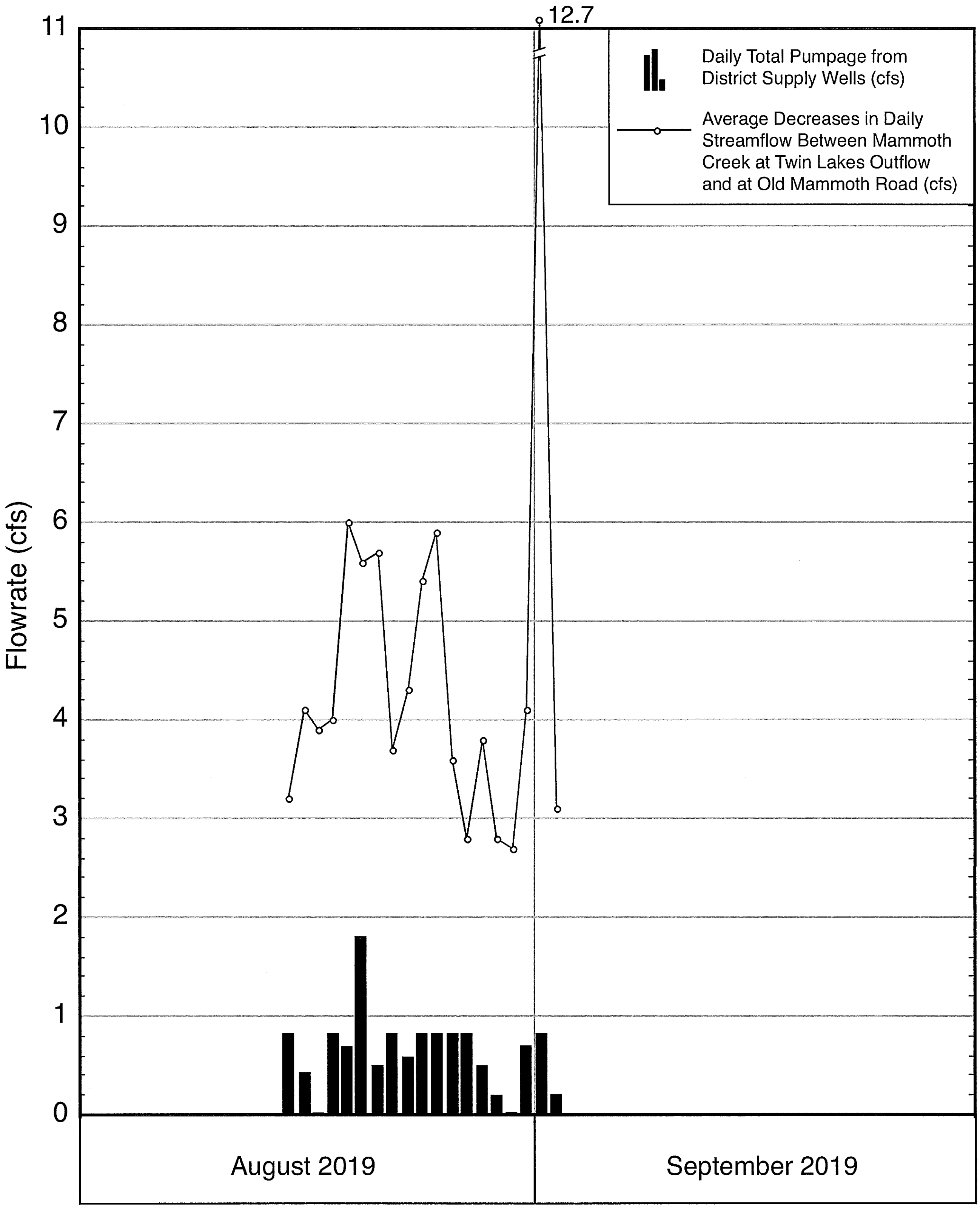

FIGURE 23 - RELATIONSHIP BETWEEN DIFFERENCE IN MAMMOTH CREEK STREAMFLOW AT TWIN LAKES OUTFLOW AND OLD MAMMOTH ROAD AND DISTRICT SUPPLY WELL PUMPAGE (AUGUST - SEPTEMBER, 2019)

sides and upgradient of the Creek. The differences in streamflow in 2018 were not during a drought period, and were thus due to some other factor.

During October 24-November 7, 2007 a comprehensive aquifer test was conducted by the District, using Well No. 15 as the pumped well. As part of the test, pumpage of Well No. 15, streamflow at Old Mammoth Road, and water levels in a number of wells were measured. The results indicated no influence of pumping Well No. 15 on streamflow in Mammoth Creek (KDSA, 2008). The results of monitoring changes in streamflow and District pumpage have shown no effect of this pumpage on streamflow.

VALENTINE RESERVE SPRINGFLOW

Commencing in 2001, flow measurements at the Valentine Reserve were extended to another spring, which had a considerably larger flow than the previously monitored spring. Longer records were available for the previously monitored spring. However, no springflow records have been provided since 2001. Figure 24 shows flow of the previously monitored spring (1993-2001) and Mammoth Creek streamflow at Old Mammoth Road (1993-2019). The springflow correlated well with Mammoth Creek streamflow during the period of record. The lowest springflows were in

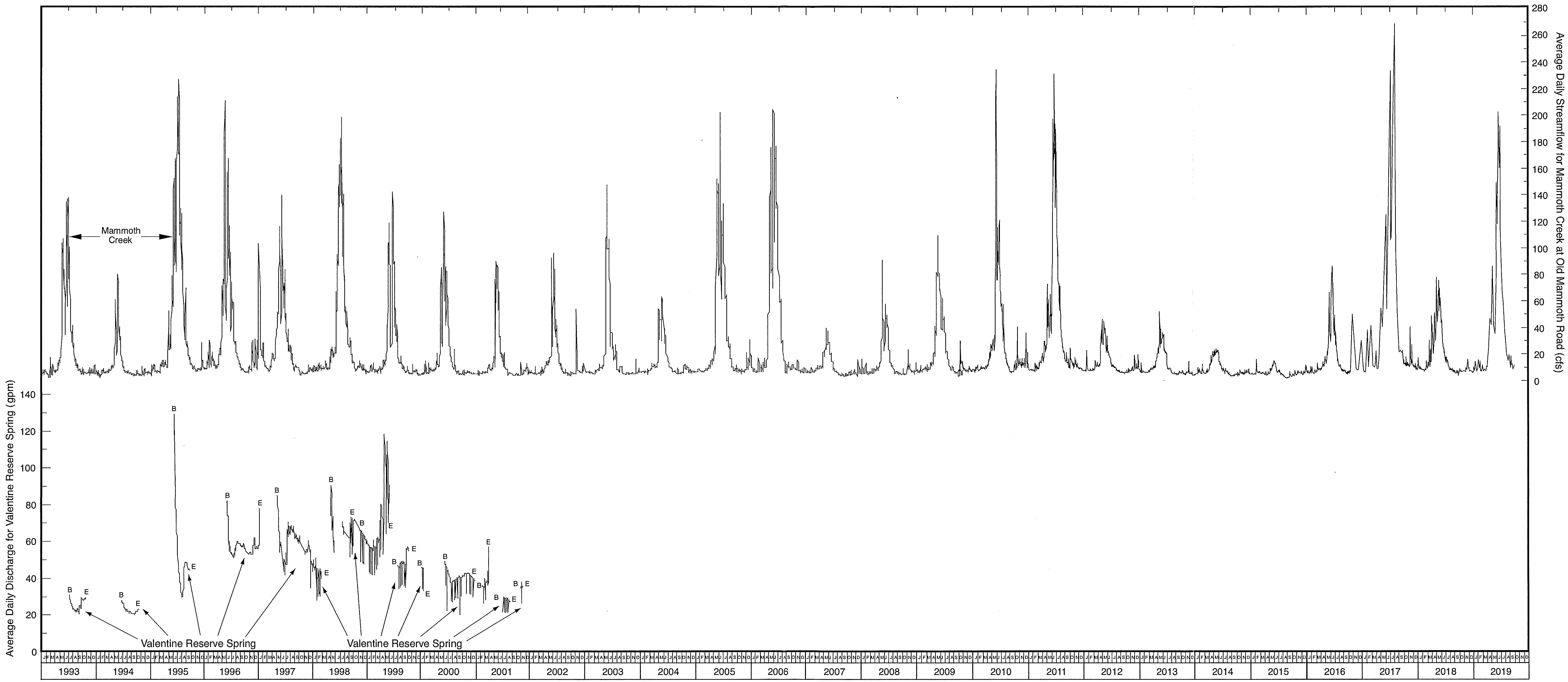

FIGURE 24 - FLOW FOR VALENTINE SPRING (1993-2001) AND MAMMOTH CREEK STREAMFLOW (1993-2019)

1993, 1994, and 2001, following periods of low winter precipitation. Springflow often increased in the fall prior to winter precipitation. This was primarily due to lower air temperatures and decreased evapotranspiration of shallow groundwater. Monitoring results for the previous years indicate no noticeable impact of District pumping on springflow at the Valentine Reserve.

DATA EVALUATION AND INTERPRETATION

Water-level hydrographs for the many of the monitor wells tapping the uppermost glacial till strata in and near the District well field indicated rising water levels during the 2019 water year. This was due to the greater precipitation during this water year compared to the previous water year. Water-level hydrographs for most of the District supply wells (tapping the basalt and interbedded glacial fill) indicated rising or stable water levels during the 2019 water year. This is attributed to below average pumping during the 2017-19 water years and recharge. Water levels in wells tapping consolidated rocks in the area east of the District well field rose or were stable during the 2019 water year. Greater recharge during 2019 year compared to the previous water year was the primary factor influencing this trend.

The water-level elevation contour map for late September 2019

(Figure 21) confirms that the cone of depression due to pumping of District wells is localized, and did not extend east to Well No. 24. Because the water levels in the consolidated rock in the well field are well below the channel of Mammoth Creek, there has been no apparent impact of District pumping on streamflow. There has been no impact on flow of the springs at the Valentine Reserve (for periods when records are available), or on the flow of the Hot Creek headsprings due to pumping of the District supply wells.

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FIGURE 2 - SUBSURFACE GEOLOGIC CROSS SECTION A - A'

APPENDIX A

PUMPAGE AND WATER-LEVEL DATA FOR DISTRICT SUPPLY WELLS

MAMMOTH COMMUNITY WATER DISTRICT
TOTAL PUMPAGE
2018 - 2019

Well (All)

MG Totals												
	2018			2019								
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.51	0.52
2	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.39	0.47	0.15
3	0.00	0.02	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.72	0.17
4	0.00	0.43	0.16	0.00	0.00	0.00	0.00	0.00	0.01	0.53	0.71	0.18
5	0.00	0.34	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.53	0.05
6	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.13	0.01	0.80	0.52	0.00
7	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	1.36	0.52	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.86	0.00
9	0.87	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.48	0.35	0.00
10	0.24	0.00	0.25	0.16	0.00	0.00	0.00	0.00	0.00	0.33	0.18	0.00
11	0.00	0.00	0.84	0.00	0.03	0.00	0.00	0.00	0.32	1.27	0.53	0.00
12	0.00	0.00	0.52	0.05	0.18	0.00	0.00	0.00	0.00	0.21	0.52	0.00
13	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.34	0.00
14	0.00	0.00	0.00	0.50	0.10	0.00	0.00	0.00	0.02	0.61	0.17	0.00
15	1.15	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.31	1.01	0.51	0.00
16	0.70	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.67	0.84	0.23	0.00
17	0.45	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.48	0.53	0.00	0.00
18	0.17	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.25	0.52	0.52	0.00
19	0.00	0.00	0.18	0.00	0.00	0.50	0.00	0.00	0.25	0.51	0.43	0.36
20	0.00	0.00	0.17	0.00	0.00	0.03	0.00	0.28	0.30	0.72	1.17	0.00
21	0.00	0.00	0.16	0.00	0.00	0.33	0.00	0.00	0.40	0.72	0.33	0.00
22	0.14	0.00	0.00	0.00	0.00	0.82	0.09	0.00	0.74	0.55	0.52	0.00
23	0.76	0.00	0.00	0.16	0.00	0.00	0.70	0.00	0.79	0.53	0.40	0.00
24	0.41	0.00	0.00	0.15	0.00	0.00	0.15	0.00	0.56	0.56	0.52	0.00
25	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.47	0.86	0.52	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.21	0.52	0.00
27	0.40	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00
28	0.00	0.17	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.72	0.33	0.00
29	0.00	0.15	0.00	0.08		0.00	0.00	0.01	0.00	0.46	0.15	0.00
30	0.00	0.00	0.00	0.57		0.00	0.00	0.01	0.21	0.39	0.02	0.00
31	0.02		0.00	0.01		0.00		0.00		0.48	0.42	
Grand Total	5.32	1.64	3.38	2.05	0.37	1.67	0.94	0.44	6.18	17.77	14.04	1.43

MAMMOTH COMMUNITY WATER DISTRICT
ANNUAL PUMPAGE REPORT
2018 - 2019

Average CFS	Months and Years												
	2018			2019									CFS
Wells	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
1	0.17	0.04	0.02	0.19	0.16	0.04	0.14	0.08	0.41	16.90	19.65	1.67	39.47
6	1.29	0.07	0.56	0.28	0.03	0.81	0.25	0.08	0.07	2.55	0.09	0.11	6.19
10	1.29	0.06	0.56	0.27	0.03	0.79	0.25	0.33	0.10	2.50	0.08	0.11	6.38
15	1.13	0.06	0.51	0.25	0.03	0.75	0.22	0.07	0.06	2.31	0.07	0.10	5.57
16	1.07	0.55	0.01	0.09	0.02	0.03	0.06	0.01	0.93	0.07	0.03	0.01	2.88
17	0.20	0.04	0.39	0.35	0.12	0.07	0.19	0.03	4.81	1.37	0.78	0.09	8.46
18	0.74	0.85	2.64	1.35	0.00	0.02	0.01	0.03	0.02	0.02	0.01	0.01	5.70
20	0.20	0.02	0.28	0.25	0.09	0.02	0.15	0.02	0.06	0.95	0.53	0.05	2.62
25	2.13	0.84	0.24	0.16	0.10	0.04	0.17	0.02	3.10	0.83	0.48	0.06	8.17
CFS	8.22	2.53	5.22	3.18	0.57	2.58	1.45	0.69	9.56	27.50	21.72	2.21	85.44

MAMMOTH COMMUNITY WATER DISTRICT
TOTAL PUMPAGE
2018 - 2019

Well 1

MG Totals												
	2018			2019								
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.51	0.52
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.47	0.15
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.72	0.17
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.53	0.71	0.18
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.53	0.05
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.52	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.41	0.00
9	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.35	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.18	0.00
11	0.00	0.00	0.01	0.00	0.03	0.00	0.00	0.00	0.03	0.20	0.53	0.00
12	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.21	0.52	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00
14	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.32	0.17	0.00
15	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.51	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.23	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.52	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.27	0.01
20	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.72	0.45	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.72	0.33	0.00
22	0.09	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.55	0.52	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.40	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.52	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.52	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.52	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.72	0.33	0.00
29	0.00	0.00	0.00	0.08		0.00	0.00	0.01	0.00	0.46	0.15	0.00
30	0.00	0.00	0.00	0.00		0.00	0.00	0.01	0.21	0.39	0.00	0.00
31	0.00		0.00	0.01		0.00		0.00		0.48	0.42	
Grand Total	0.11	0.02	0.01	0.12	0.10	0.03	0.09	0.05	0.27	10.92	12.70	1.08

MAMMOTH COMMUNITY WATER DISTRICT
TOTAL PUMPAGE
2018 - 2019

Well 6

MG Totals												
	2018			2019								
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.05	0.00
9	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00
10	0.07	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.05	0.11	0.00	0.00
12	0.00	0.00	0.13	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00
14	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00
15	0.33	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00
16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.07
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.00
23	0.08	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.09		0.00	0.00	0.00	0.00	0.00	0.01	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Grand Total	0.83	0.04	0.36	0.18	0.02	0.52	0.16	0.05	0.05	1.65	0.06	0.07

MAMMOTH COMMUNITY WATER DISTRICT
TOTAL PUMPAGE
2018 - 2019

Well 10

MG Totals												
	2018			2019								
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.05	0.00
9	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00
10	0.07	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.04	0.10	0.00	0.00
12	0.00	0.00	0.13	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00
14	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.02	0.10	0.00	0.00
15	0.33	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00
16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.07
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00
23	0.08	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.09		0.00	0.00	0.00	0.00	0.00	0.01	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Grand Total	0.83	0.04	0.36	0.17	0.02	0.51	0.16	0.22	0.07	1.61	0.05	0.07

MAMMOTH COMMUNITY WATER DISTRICT
TOTAL PUMPAGE
2018 - 2019

Well 15

MG Totals												
	2018			2019								
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.04	0.00
9	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00
10	0.06	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.04	0.10	0.00	0.00
12	0.00	0.00	0.12	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00
14	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00
15	0.30	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00
16	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.06
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00
23	0.04	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.08		0.00	0.00	0.00	0.00	0.00	0.01	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Grand Total	0.73	0.04	0.33	0.16	0.02	0.48	0.14	0.05	0.04	1.50	0.05	0.06

MAMMOTH COMMUNITY WATER DISTRICT
TOTAL PUMPAGE
2018 - 2019

Well 16

MG Totals												
	2018			2019								
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
9	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
16	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00
17	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00
18	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.01
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.09	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.13	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
24	0.17	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00
27	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.05		0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.01		0.00	0.00		0.00		0.00		0.00	0.00	
Grand Total	0.69	0.35	0.01	0.06	0.01	0.02	0.04	0.01	0.60	0.04	0.02	0.01

MAMMOTH COMMUNITY WATER DISTRICT
TOTAL PUMPAGE
2018 - 2019

Well 17

MG Totals												
	2018			2019								
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00
9	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00
10	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00
11	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.07	0.32	0.00	0.00
12	0.00	0.00	0.06	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.10	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.07	0.06
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.31	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.00
23	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.79	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.56	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.03	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.12		0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Grand Total	0.13	0.03	0.25	0.23	0.08	0.05	0.12	0.02	3.11	0.89	0.50	0.06

MAMMOTH COMMUNITY WATER DISTRICT
TOTAL PUMPAGE
2018 - 2019

Well 18

MG Totals												
	2018			2019								
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
9	0.11	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.04	0.00	0.07	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.19	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
16	0.04	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.18	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
20	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
21	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.04	0.00	0.00	0.16	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.15	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Grand Total	0.48	0.55	1.71	0.87	0.00	0.01	0.01	0.02	0.01	0.01	0.01	0.01

MAMMOTH COMMUNITY WATER DISTRICT
TOTAL PUMPAGE
2018 - 2019

Well 20

MG Totals	2018			2019								
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00
9	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
10	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00
11	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.04	0.24	0.00	0.00
12	0.00	0.00	0.05	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.06	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.05	0.03
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.22	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.09	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.09		0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Grand Total	0.13	0.02	0.18	0.16	0.06	0.01	0.10	0.02	0.04	0.62	0.34	0.03

MAMMOTH COMMUNITY WATER DISTRICT
TOTAL PUMPAGE
2018 - 2019

Well 25

MG Totals												
	2018			2019								
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00
9	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
10	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00
11	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.04	0.20	0.00	0.00
12	0.00	0.00	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.06	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.03	0.00	0.00
16	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.00
17	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00
18	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.25	0.00	0.04	0.04
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.20	0.00	0.19	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.25	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00
24	0.24	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00
27	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.04		0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.01		0.00	0.00		0.00		0.00		0.00	0.00	
Grand Total	1.38	0.55	0.16	0.10	0.07	0.03	0.11	0.01	2.00	0.53	0.31	0.04

PRODUCTION WELL
WATER LEVEL DATA
OCTOBER 2018 - SEPTEMBER 2019

Well No.	1		
Date	Static	Date	Pumping
10/08/18	174.58	10/22/18	199.23
11/29/18	173.36	11/15/18	196.57
12/24/18	172.64	12/11/18	194.42
01/29/19	171.93	01/29/19	196.36
02/21/19	170.60	02/12/19	195.24
03/20/19	169.88	03/20/19	192.68
04/30/19	168.04	04/22/19	193.50
05/30/19	163.75	05/01/19	184.71
06/28/19	163.23	06/30/19	188.29
07/09/19	166.00	07/26/19	200.45
08/01/19	177.04	08/28/19	215.28
09/28/19	173.87	09/01/19	212.42
Mean	170.41		197.43
Min	163.23		184.71
Max	177.04		215.28
Historical			
Mean	194.71		242.41
Min	149.75		184.71
Max	268.10		303.16

Well No.	6		
Date	Static	Date	Pumping
10/06/18	4.60	10/15/18	72.12
11/05/18	5.40	11/15/18	70.00
12/01/18	5.87	12/11/18	73.77
01/05/19	6.27	01/30/19	69.47
02/10/19	6.70		
03/22/19	6.90	03/22/19	76.66
04/29/19	4.13	04/23/19	68.22
05/04/19	4.13	05/20/19	54.56
06/11/19	4.02	06/11/19	51.60
07/08/19	3.93	07/08/19	68.59
08/05/19	3.91	08/08/19	51.46
09/18/19	3.07	09/19/19	50.45
Mean	4.91		64.26
Min	3.07		50.45
Max	6.90		76.66
Historical			
Mean	47.42		144.39
Min	0.00		9.05
Max	160.00		286.73

Well No.	17		
Date	Static	Date	Pumping
10/31/18	385.31	10/09/18	390.10
11/15/18	385.06	11/30/18	389.00
12/10/18	384.98	12/11/18	389.76
01/17/19	384.53	01/30/19	389.37
02/01/19	384.77	02/14/19	389.41
03/19/19	384.44	03/19/19	388.81
04/18/19	383.99	04/23/19	388.86
05/15/19	384.18	05/20/19	388.69
06/13/19	383.80	06/24/19	390.43
07/26/19	383.36	07/06/19	389.01
08/31/19	382.76	08/08/19	388.22
09/16/19	382.19	09/19/19	387.55
Mean	384.11		389.10
Min	382.19		387.55
Max	385.31		390.43
Historical			
Mean	378.29		387.88
Min	356.44		369.52
Max	409.90		402.10

Well No.	18		
Date	Static	Date	Pumping
10/08/18	59.69	10/09/18	132.04
11/24/18	61.25	11/27/18	131.56
12/03/18	65.29	12/04/18	127.94
01/06/19	65.29	01/25/19	121.49
02/28/19	64.81		
03/21/19	64.26	03/19/19	114.97
04/30/19	62.94	04/23/19	114.78
05/27/19	58.00	05/20/19	112.00
06/22/19	55.00	06/11/19	110.00
07/19/19	54.44	07/15/19	103.67
08/11/19	54.62	08/30/19	55.37
09/10/19	55.13	09/19/19	74.78
Mean	60.06		108.96
Min	54.44		55.37
Max	65.29		132.04
Historical			
Mean	75.01		225.44
Min	40.00		55.37
Max	171.67		361.28

PRODUCTION WELL
WATER LEVEL DATA
OCTOBER 2018 - SEPTEMBER 2019

Well No.	25		
Date	Static	Date	Pumping
10/23/18	287.64	10/18/18	454.93
11/29/18	285.39	11/05/18	445.71
12/25/18	284.98	12/11/18	425.00
01/29/19	284.46	01/30/19	427.77
02/27/19	283.13	02/12/19	428.28
03/26/19	281.90	03/19/19	422.23
04/30/19	278.93	04/23/19	434.53
05/31/19	274.21	05/20/19	415.47
06/30/19	270.93	06/16/19	453.91
07/05/19	273.60	07/06/19	433.61
08/01/19	285.59	08/20/19	441.61
09/30/19	286.31	09/19/19	426.74
Mean	281.42		434.15
Min	270.93		415.47
Max	287.64		454.93
Historical			
Mean	304.31		445.12
Min	270.93		386.25
Max	361.24		483.85

PRODUCTION WELL
WATER LEVEL DATA
OCTOBER 2018 - SEPTEMBER 2019

Well No.	10		
Date	Static	Date	Pumping
10/04/18	16.14	10/16/18	67.10
11/09/18	17.45	11/15/18	68.00
12/01/18	17.57	12/11/18	69.12
01/06/19	18.76	01/30/19	68.76
02/04/19	19.48		
03/09/19	19.60	03/22/19	70.43
04/30/19	11.02	01/23/19	64.24
05/20/19	9.71	05/06/19	54.24
06/01/19	10.07	06/11/19	51.74
07/05/19	10.07	07/08/19	55.90
08/01/19	11.14	08/08/19	53.29
09/30/19	11.38	09/19/19	54.12
Mean	14.37		61.54
Min	9.71		51.74
Max	19.60		70.43
Historical			
Mean	58.69		136.21
Min	0.00		40.92
Max	164.00		254.358

Well No.	15		
Date	Static	Date	Pumping
10/30/18	182.49	10/16/18	191.96
11/29/18	180.10	11/15/18	187.59
12/31/18	179.63	12/12/18	189.00
01/01/19	179.61	01/14/19	186.85
02/04/19	179.63		
03/31/19	179.72	03/22/19	185.19
04/11/19	179.68	04/23/19	183.87
05/15/19	180.00	05/20/19	182.00
06/11/19	181.00	06/11/19	179.81
07/20/19	179.77	07/17/19	185.79
08/17/19	179.78	08/08/19	180.36
09/30/19	179.68	09/19/19	180.70
Mean	180.09		184.83
Min	179.61		179.81
Max	182.49		191.96
Historical			
Mean	229.44		260.36
Min	168.15		179.81
Max	321.35		364.98

Well No.	20		
Date	Static	Date	Pumping
10/21/18	410.62	10/23/28	449.13
11/29/18	409.60	11/01/18	480.00
12/25/18	409.43	12/12/18	447.33
01/20/19	409.08	01/30/19	448.53
02/21/19	408.66	02/12/19	445.28
03/20/19	408.40	03/19/19	443.91
04/15/19	407.97	04/23/19	445.28
05/19/19	407.54	05/20/19	443.65
06/21/19	407.20	06/11/19	442.88
07/05/19	407.46	07/11/19	446.39
08/16/19	408.57	08/20/19	448.27
09/28/19	407.63	09/19/19	443.39
Mean	408.51		448.67
Min	407.20		442.88
Max	410.62		480.00
Historical			
Mean	412.37		483.93
Min	376.20		417.80
Max	470.95		553.44

Well No.	16		
Date	Static	Date	Pumping
10/08/18	469.90	10/17/18	527.94
11/29/18	469.25	11/02/18	524.68
12/31/18	468.31	12/11/18	523.77
01/30/19	467.65	01/30/19	524.73
02/21/19	467.35	02/12/19	522.95
03/12/19	466.68	03/19/19	523.64
04/20/19	465.93	04/23/19	524.15
05/19/19	465.37	05/20/19	523.66
06/02/19	465.11	06/17/19	526.11
07/08/19	466.32	07/25/19	524.59
08/31/19	465.97	08/20/19	481.46
09/19/19	464.48	09/19/19	524.59
Mean	466.86		521.02
Min	464.48		481.46
Max	469.90		527.94
Historical			
Mean	469.79		502.48
Min	327.00		471.47
Max	514.60		569.05

APPENDIX B

PUMPAGE AND WATER-LEVEL HYDROGRAPHS FOR EARLIER DISTRICT SUPPLY WELLS

WATER-LEVEL AND PUMPAGE HYDROGRAPH FOR WELL NO. 1

WATER-LEVEL AND PUMPAGE HYDROGRAPH FOR WELL NO. 6

WATER-LEVEL AND PUMPAGE HYDROGRAPH FOR WELL NO. 10

APPENDIX C

WATER-LEVEL MEASUREMENTS
FOR MONITOR WELLS

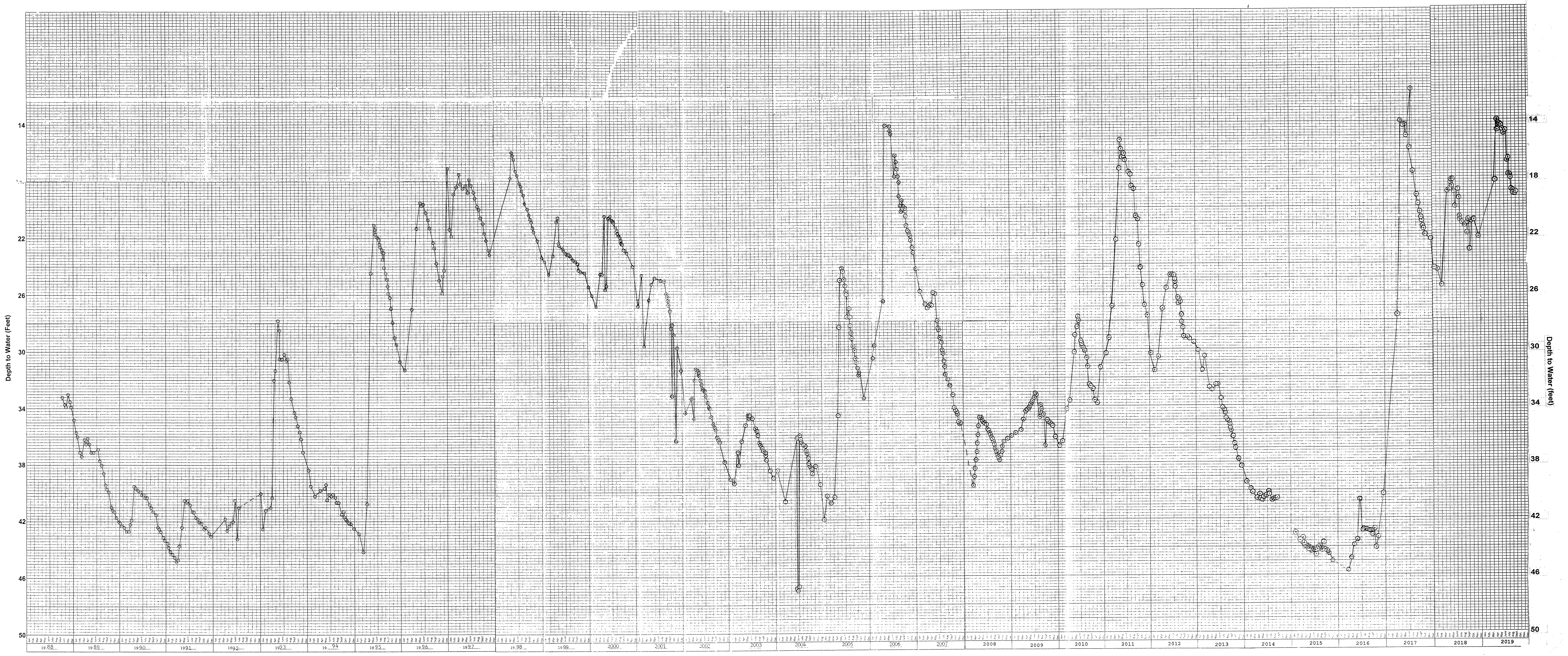
MAMMOTH COMMUNITY WATER DISTRICT
MONITOR WELL LEVEL DATA
OCT 18 - SEP 19

Date	Well 4M	Well 5A	Well 7	Well 10M	Well 11	Well 12M	Well 19	Well 21	Well 22	Well 29
10/05/18	21.16	4.72		22.39	0.00	15.54	339.30	229.71	83.47	71.33
10/11/18	23.37	4.42	240.17	20.22	0.00	15.75	338.03	229.35	80.41	70.92
10/18/18	21.31	5.09	236.12	19.37	0.00	15.78	337.68	229.71	79.81	71.68
11/13/18	21.16	5.19	237.16	19.51	0.00	15.76	337.51	230.51	80.02	71.51
12/14/18	22.22	4.61	240.68	20.25	0.00	19.37	337.79	230.55	82.47	71.77
01/25/19		5.01		22.13	0.00	Dry	338.19	232.12	85.37	72.16
01/29/19			243.72							
02/26/19			245.03							
03/22/19		4.49		25.75	0.00	Dry	338.31			
03/26/19								230.09		76.12
04/19/19		2.66		21.27	0.00	Dry	339.81	230.23	82.79	76.72
04/24/19	18.26	2.04		19.19	0.00	Dry	339.59	230.46	82.84	77.14
05/03/19									82.88	
05/08/19	14.00	1.25	249.55	11.45	0.00	4.62	338.62	229.90	83.00	76.35
05/17/19	14.73	1.86	248.98	11.07	0.00	4.20	337.79	229.65	83.21	76.00
05/24/19	14.28	1.77	248.24	10.83	0.00	4.74	337.38	229.49	83.23	75.55
05/31/19	14.36	2.02	247.44	11.12	0.00	5.07	337.37	229.32	83.23	75.09
06/05/19			246.35							74.85
06/06/19	14.40	1.82		11.15	0.00	4.08	336.90	229.12	83.33	
06/14/19	14.65	2.12	245.39	11.17	0.00	3.82	336.78	228.79	83.42	74.32
06/29/19	14.99	2.92		11.22	0.00	4.27	336.50	228.71	83.49	72.56
07/18/19	14.78	2.88	238.21	11.10	0.00	4.21	336.32	230.10	83.55	71.13
07/26/19	16.87	2.93	237.68	12.34	0.00	4.78	336.49	227.40	80.92	68.88
08/01/19	16.70	3.15	238.01	12.80	0.00	4.82	336.24	227.47	81.68	69.40
08/07/19	17.92	3.07	238.47	13.12	0.00	5.03	336.39	227.45	81.17	69.00
08/15/19	17.97	3.17	238.23	14.01	0.00	5.27	336.71	227.86	79.46	69.16
08/23/19	18.14	3.26	239.12	14.67	0.00	5.55	336.87	227.27	80.01	70.12
08/29/19	18.92	4.22	236.27	14.07	0.00	7.01	337.04	227.41	76.91	68.12
09/06/19	19.00	4.17	236.51	14.54	0.00	7.18	336.98	227.56	77.02	67.05
09/12/19	19.22	4.37	236.49	14.77	0.00	7.42	337.03	227.31	75.22	67.17
09/20/19	19.27	4.51	236.51	14.71	0.00	7.47	337.21	227.48	75.27	67.24
09/26/19	19.14	4.49	236.21	14.69	0.00	7.51		227.41	75.21	67.36
Minimum	14.00	1.25	236.12	10.83	0.00	3.82	336.24	227.27	76.91	68.12
Maximum	23.37	5.19	249.55	25.75	0.00	19.37	339.81	232.12	85.37	77.14
Average*	29.97	4.30	258.32	23.70	11.01	14.97	340.28	248.07	81.32	79.22
Minimum*	11.63	0.00	223.40	9.69	0.00	2.72	312.33	224.46	70.79	56.95
Maximum*	46.95	8.31	343.65	32.48	50.50	27.00	357.25	365.42	89.52	98.56

* long term mean, maximum, and minimum

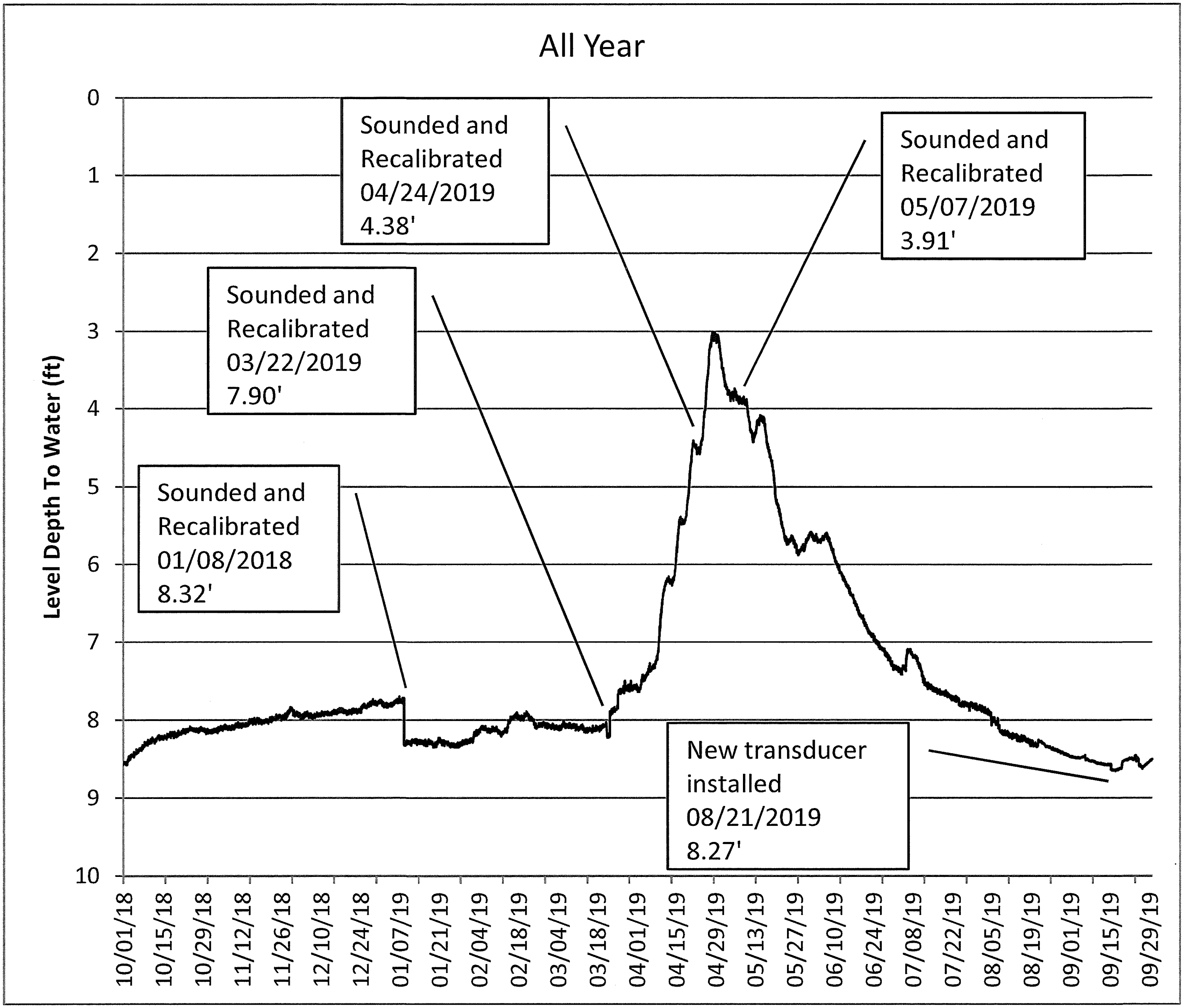
APPENDIX D

SUPPLEMENTARY WATER-LEVEL HYDROGRAPHS FOR MONITOR WELLS

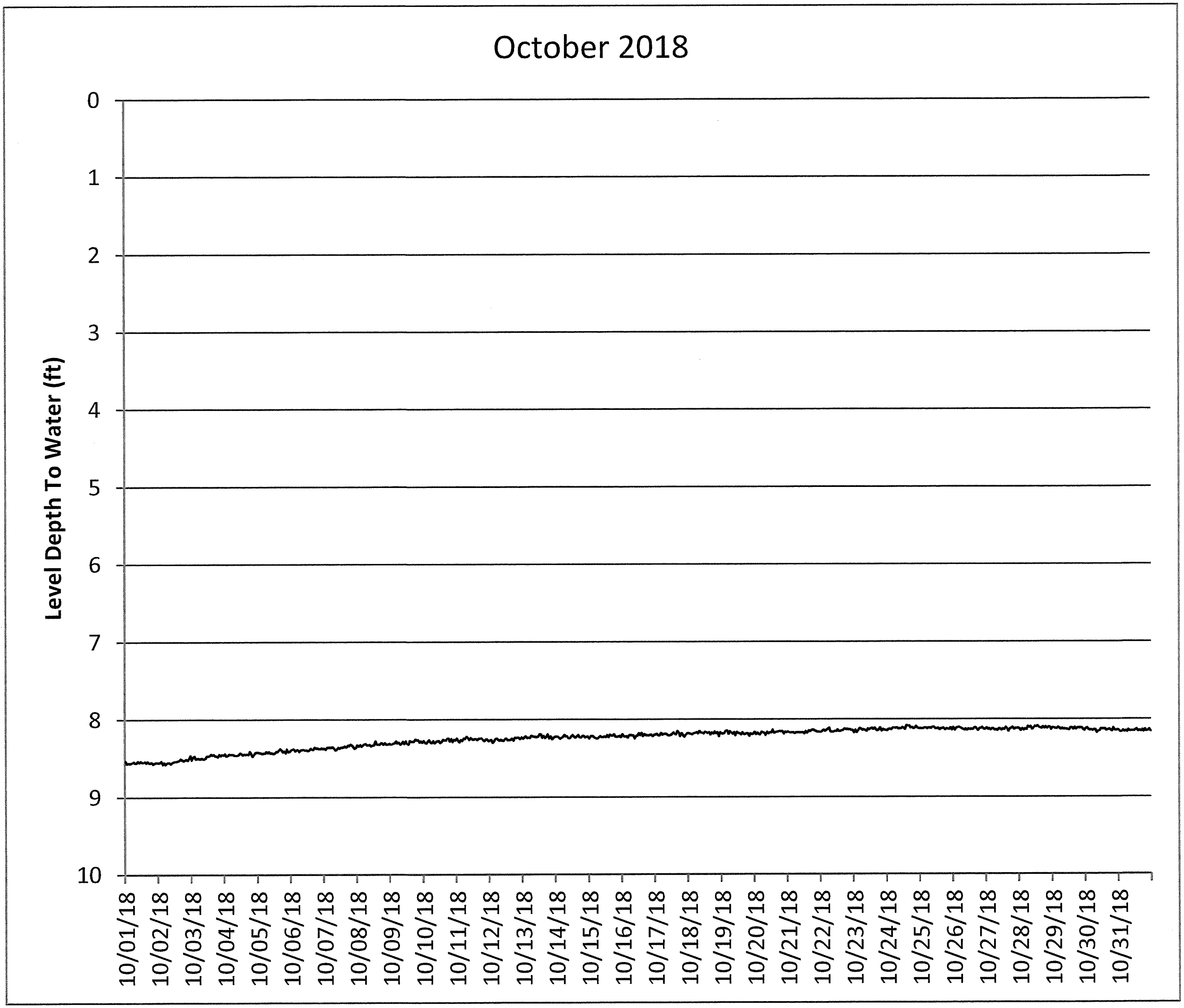


WATER-LEVEL HYDROGRAPH FOR WELL NO. 4M

WATER-LEVEL HYDROGRAPH FOR WELL NO. 5, NO. 5A, AND NO. 5M



WATER LEVEL HYDROGRAPH FOR MW-5M



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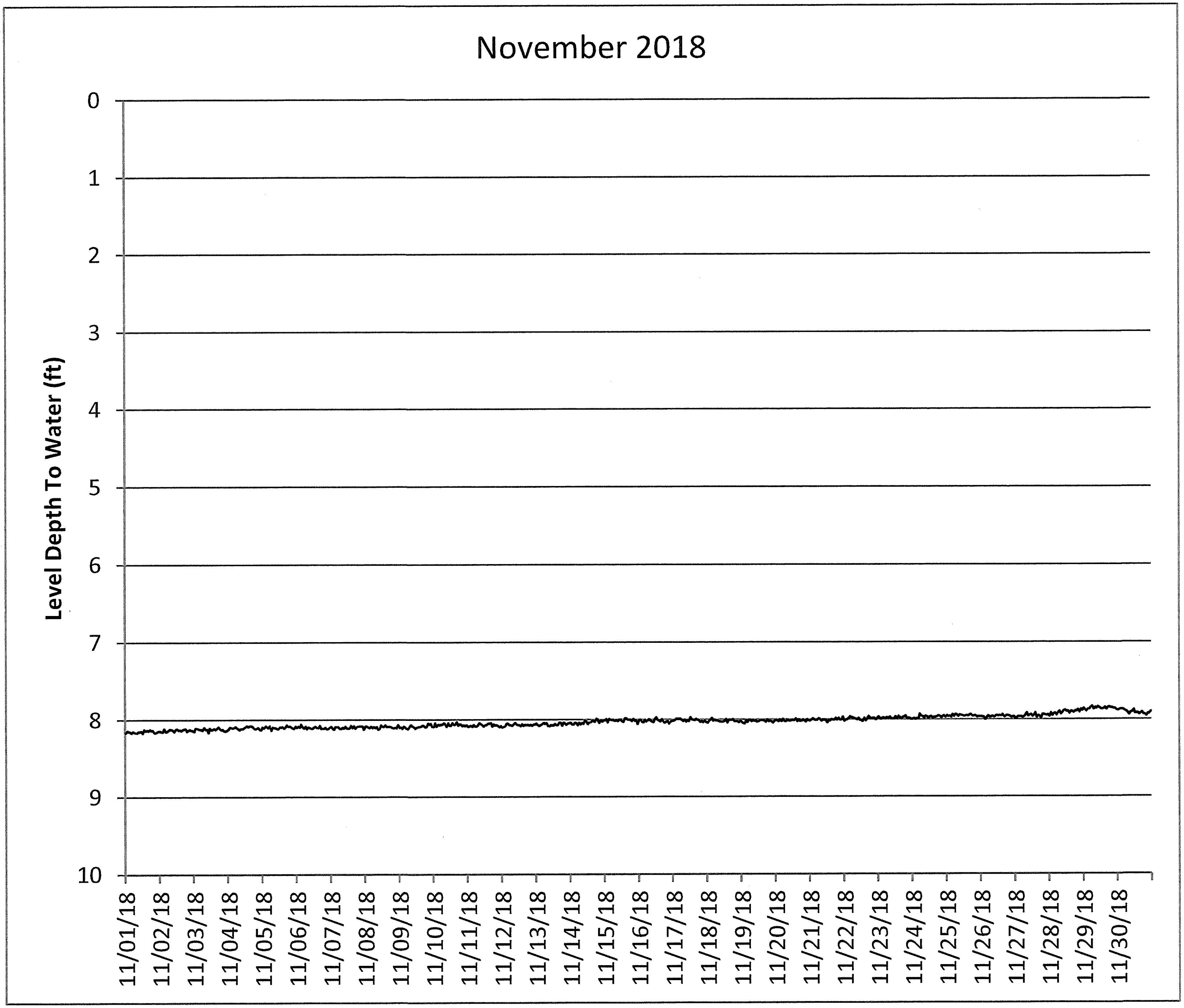

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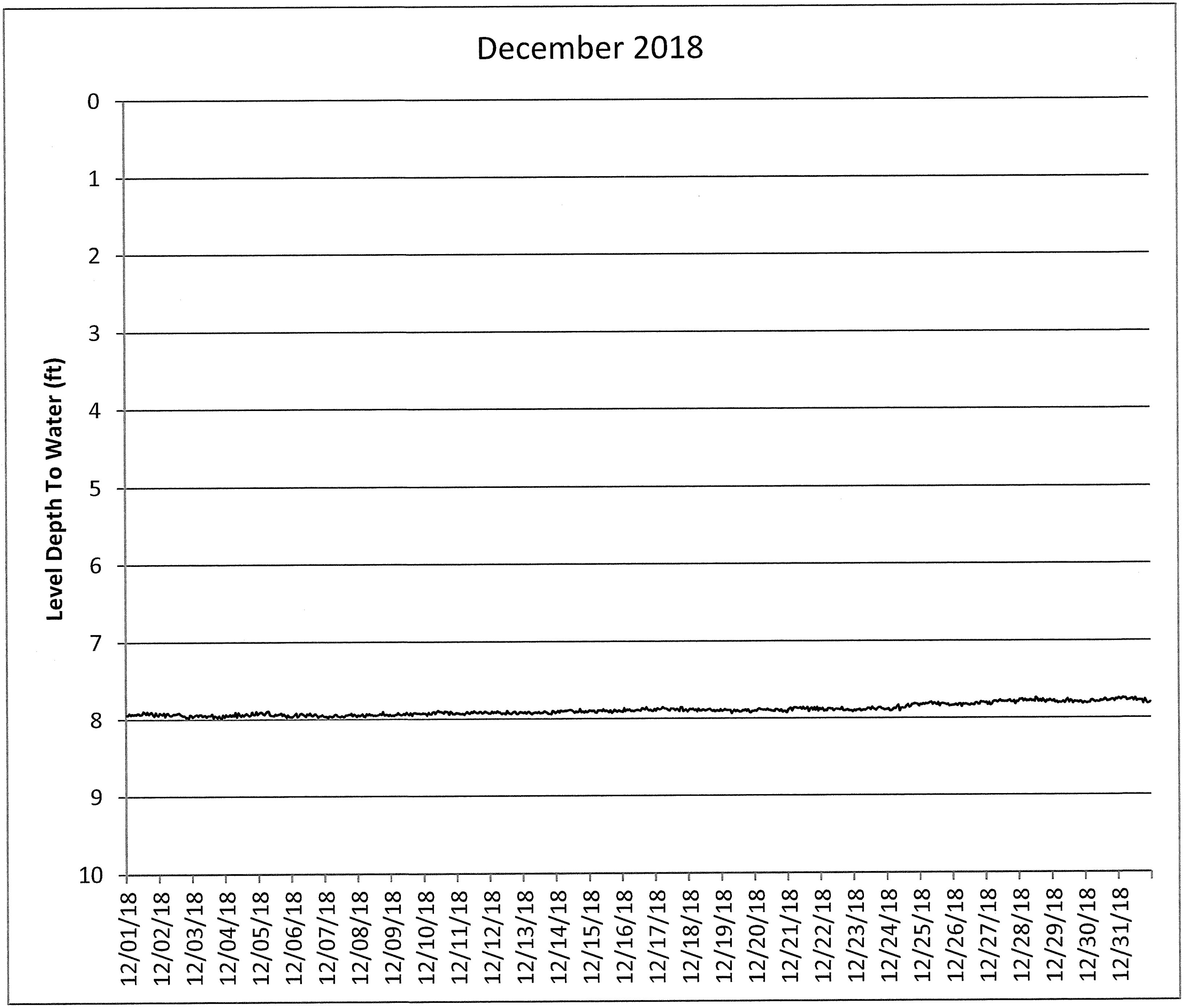

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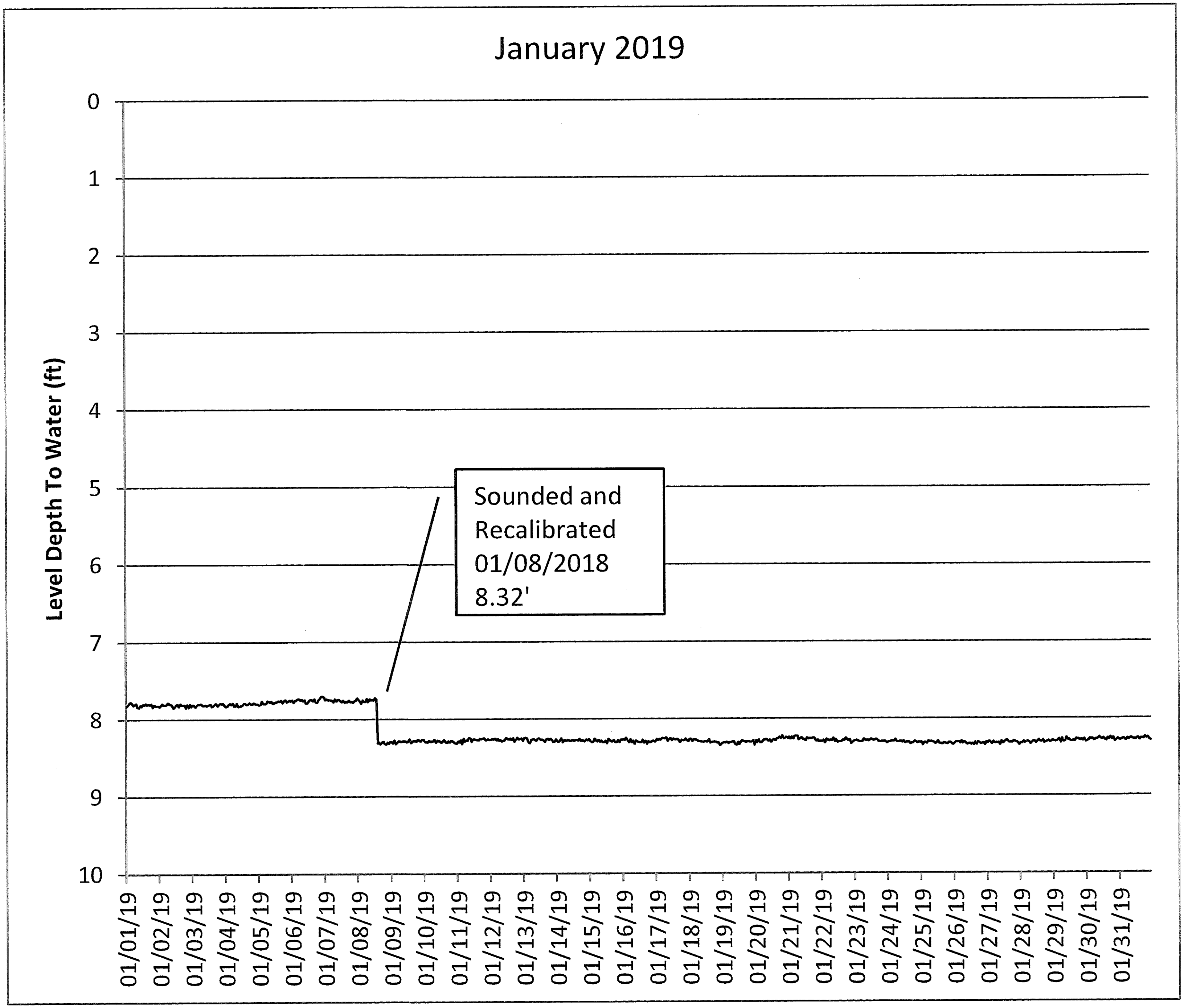

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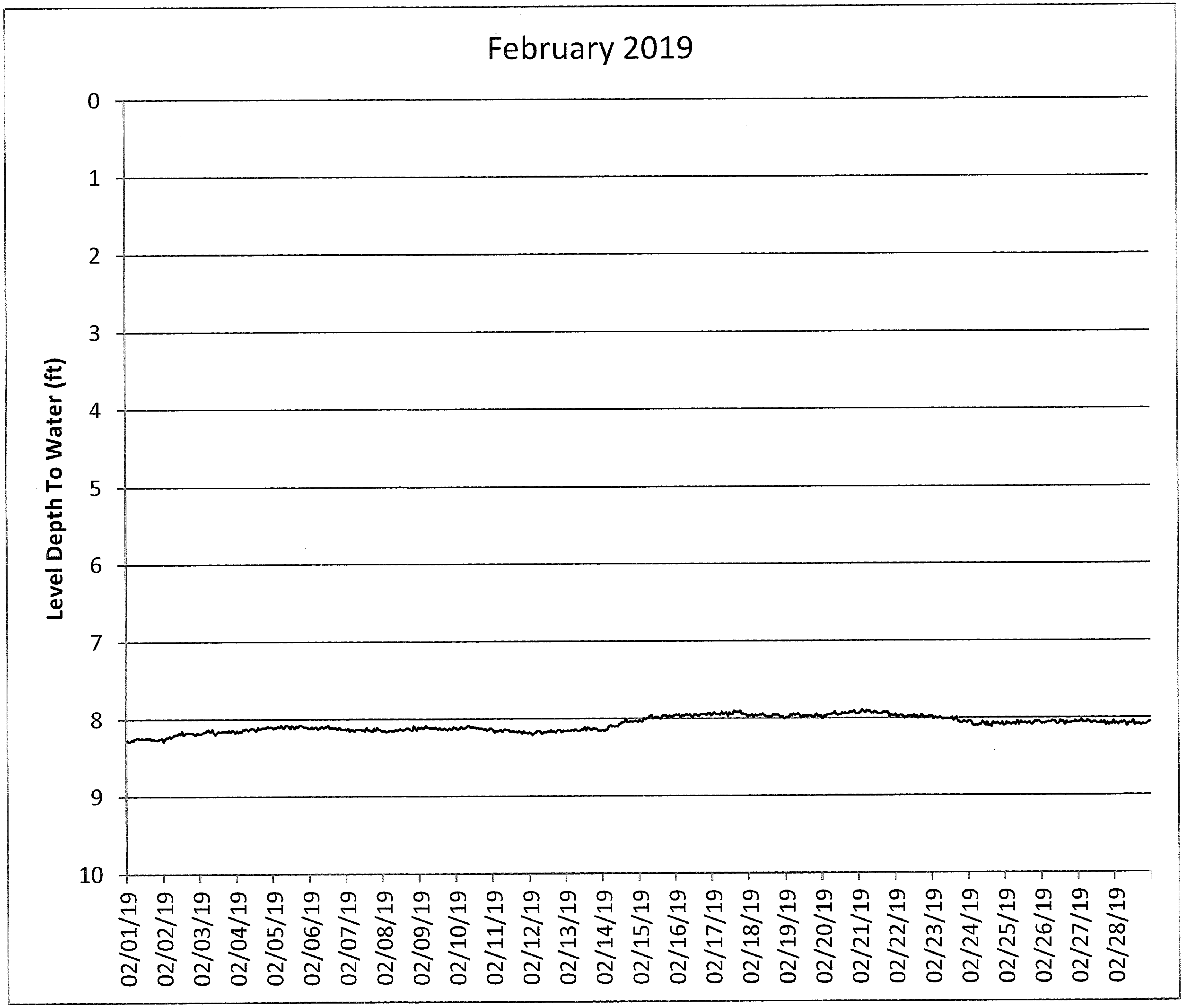

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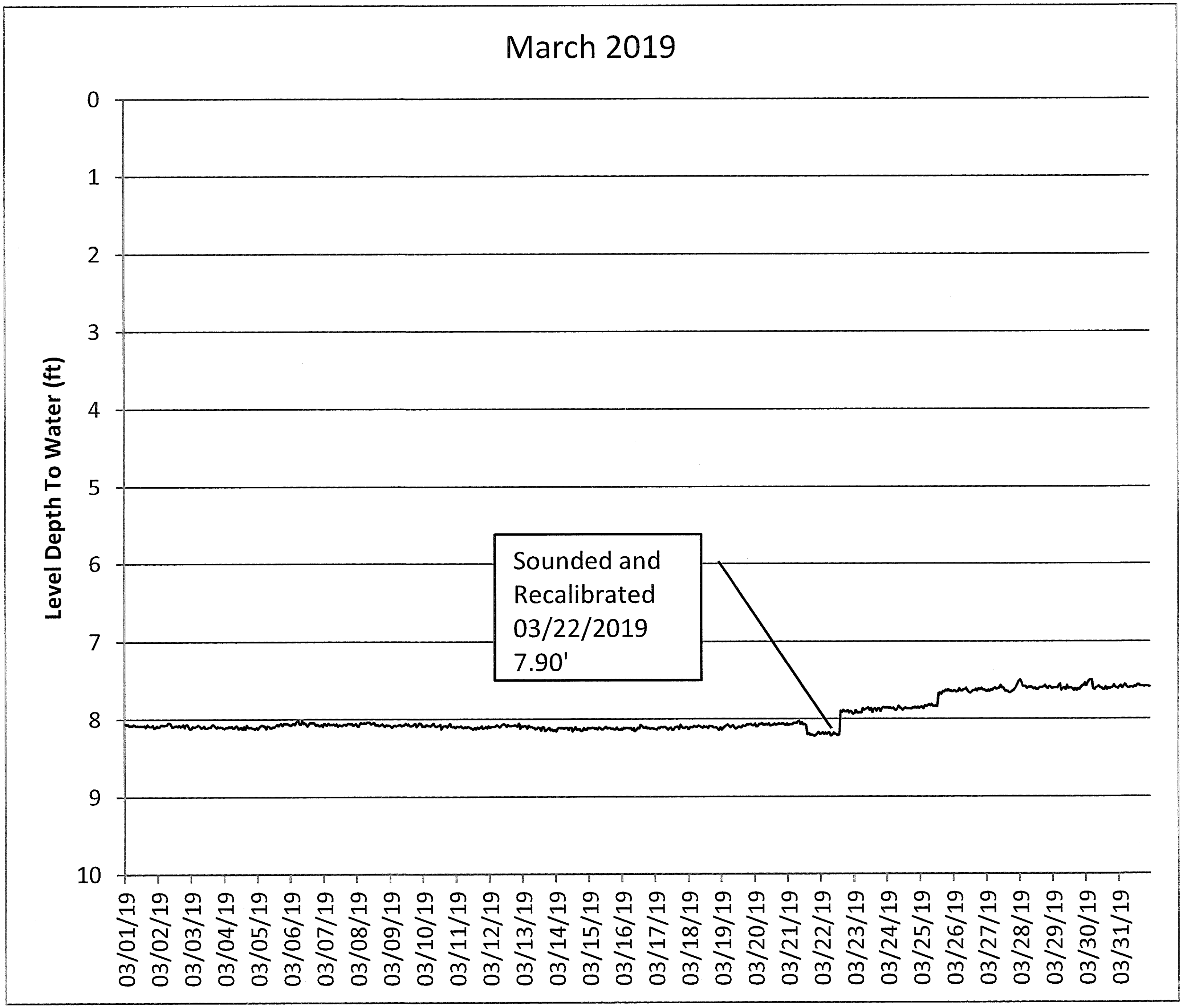

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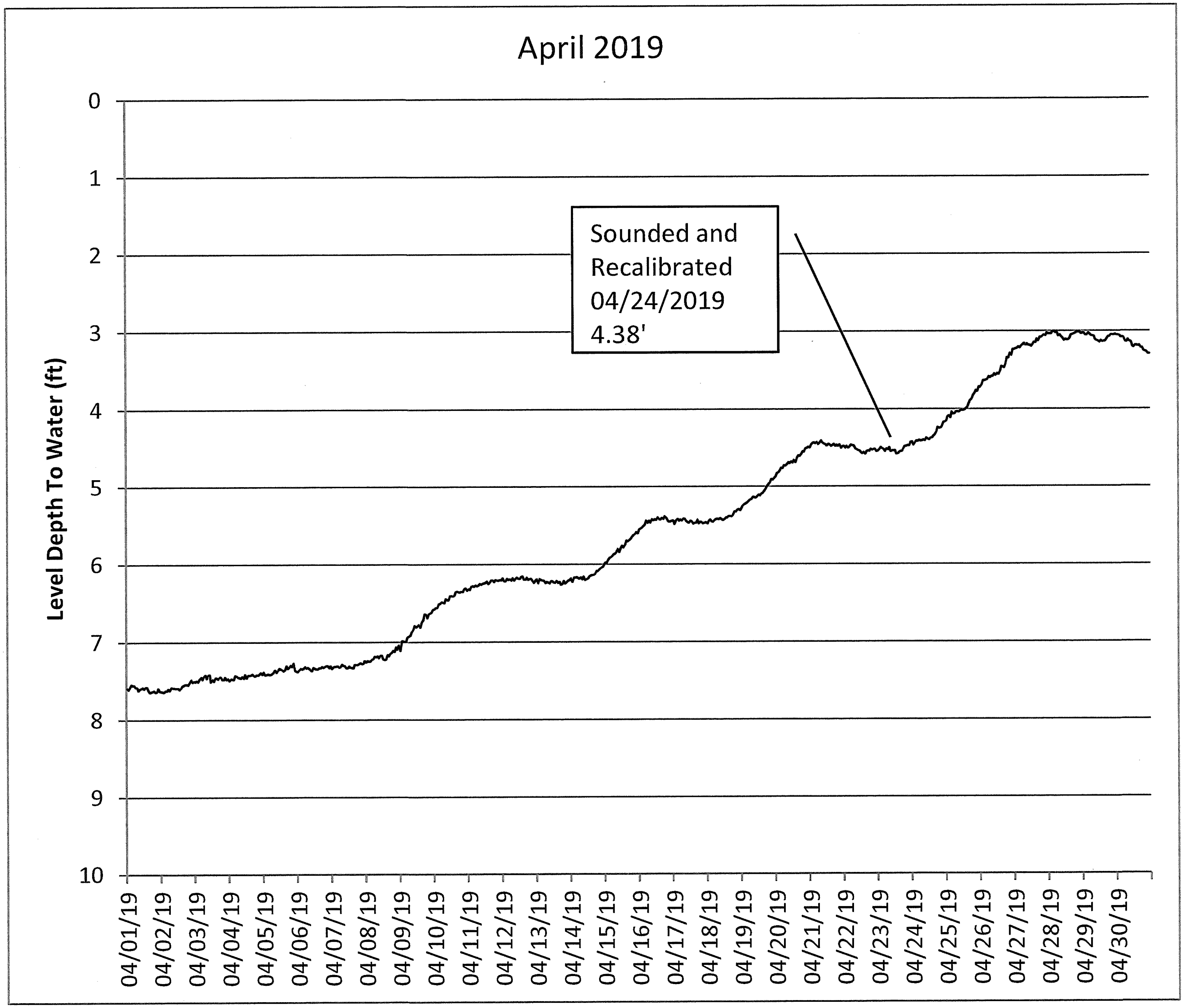

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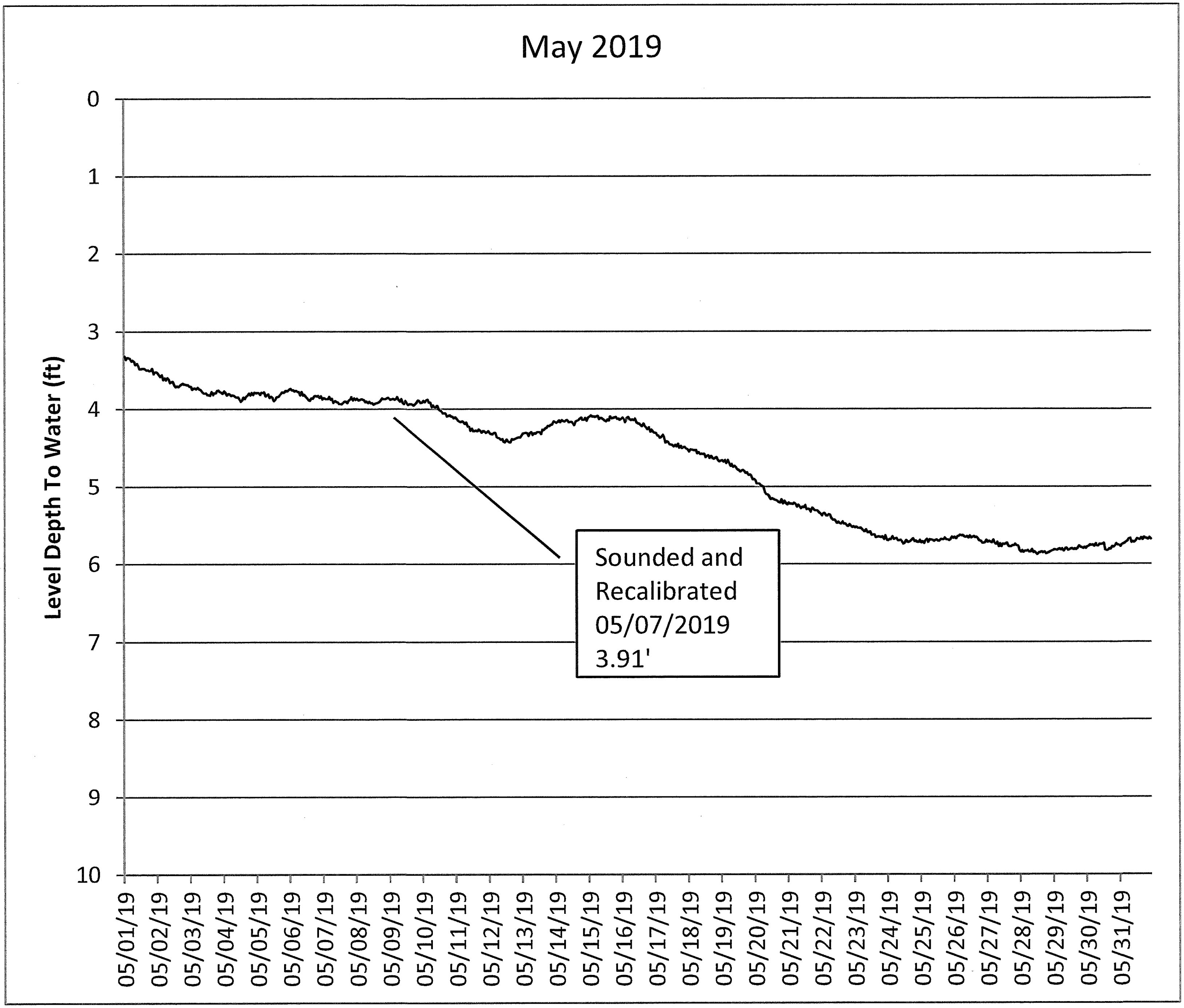

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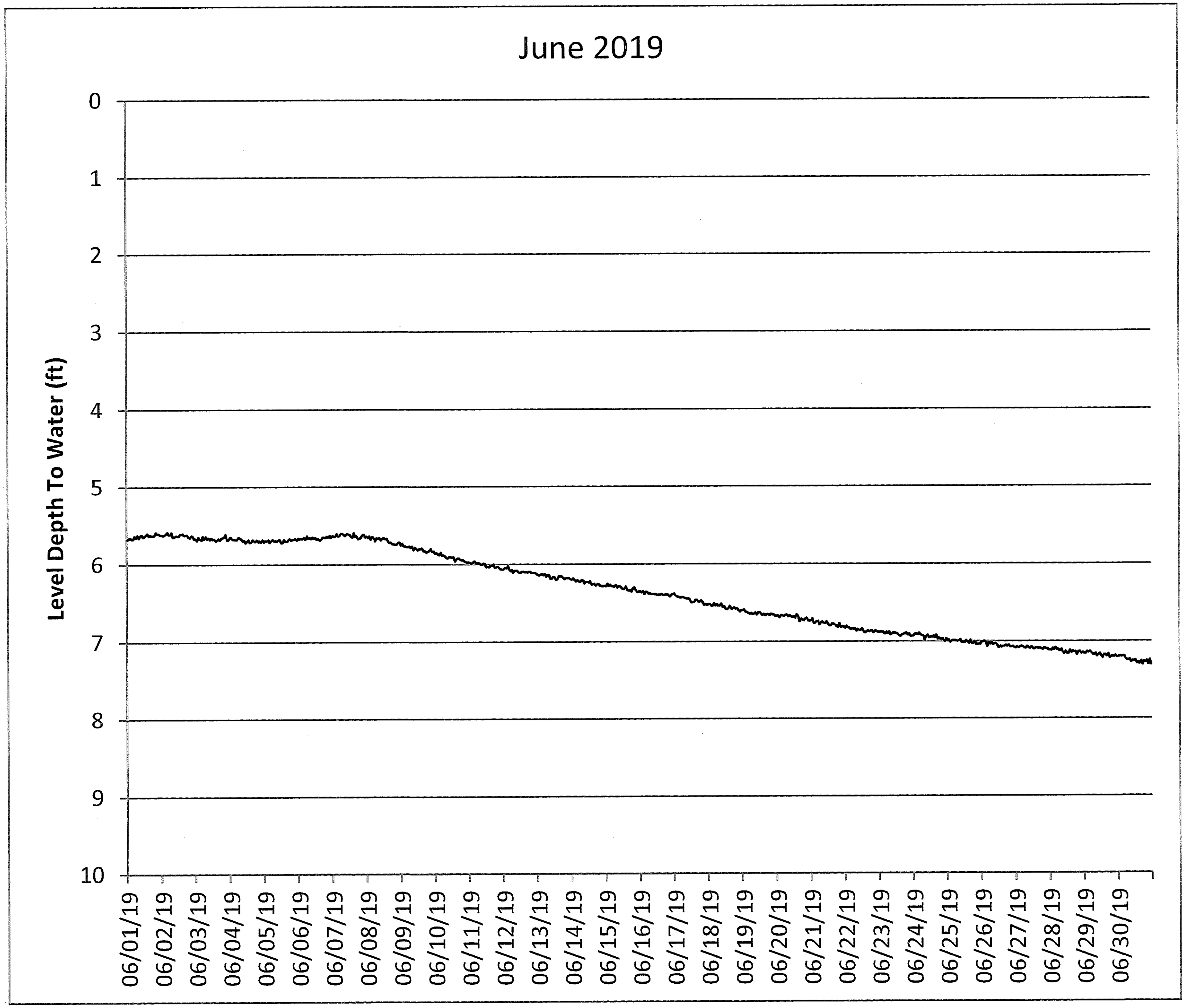

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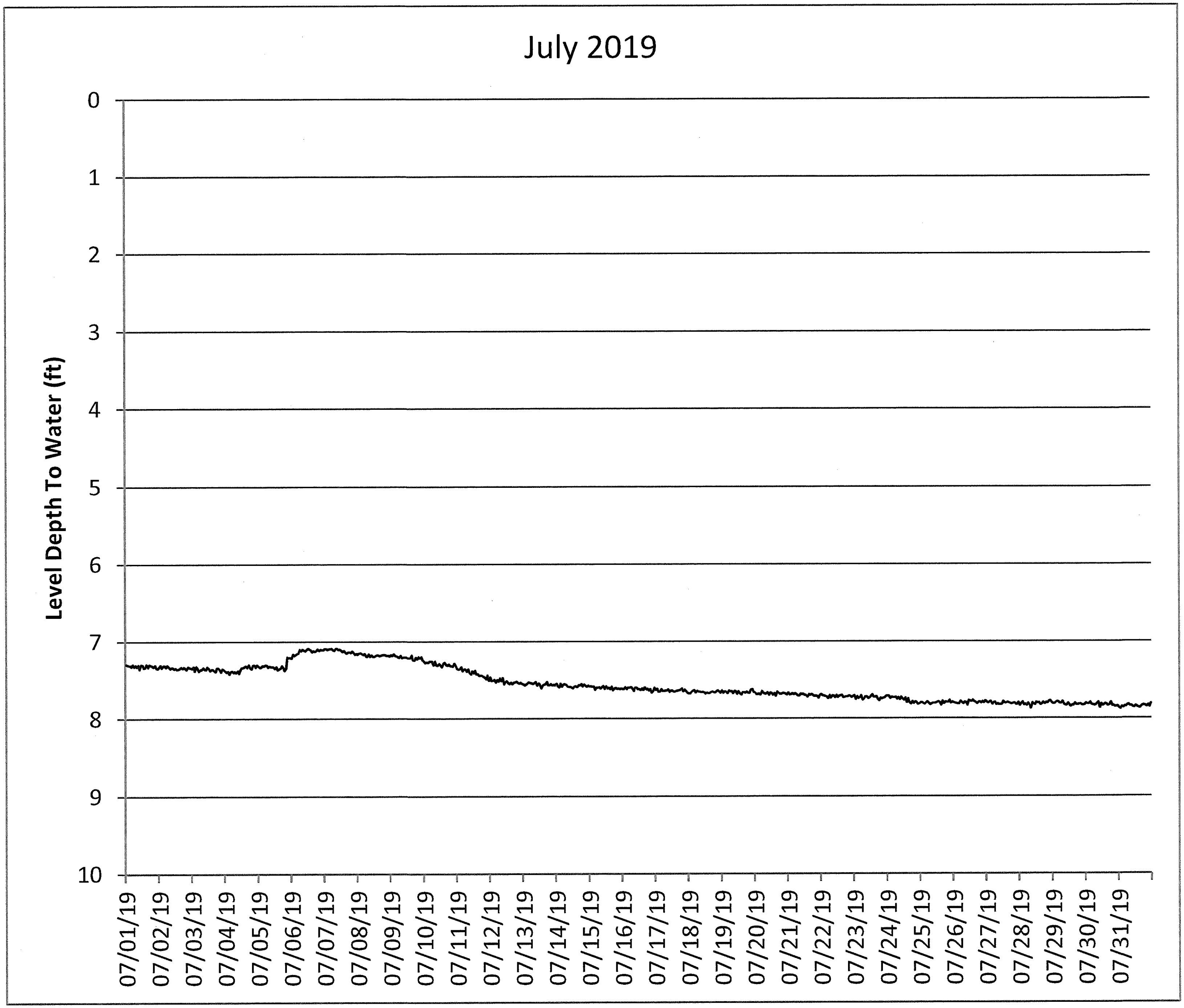

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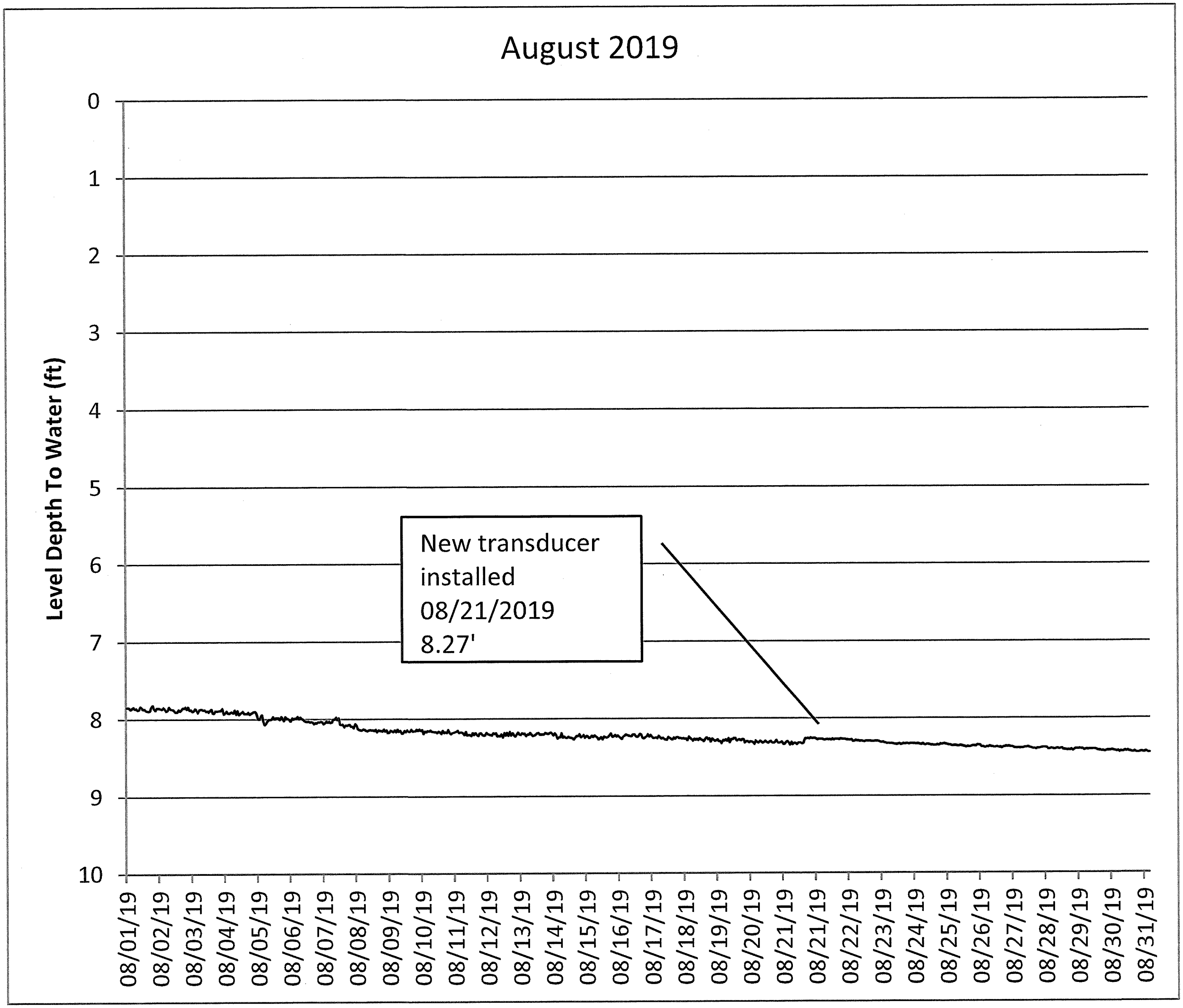
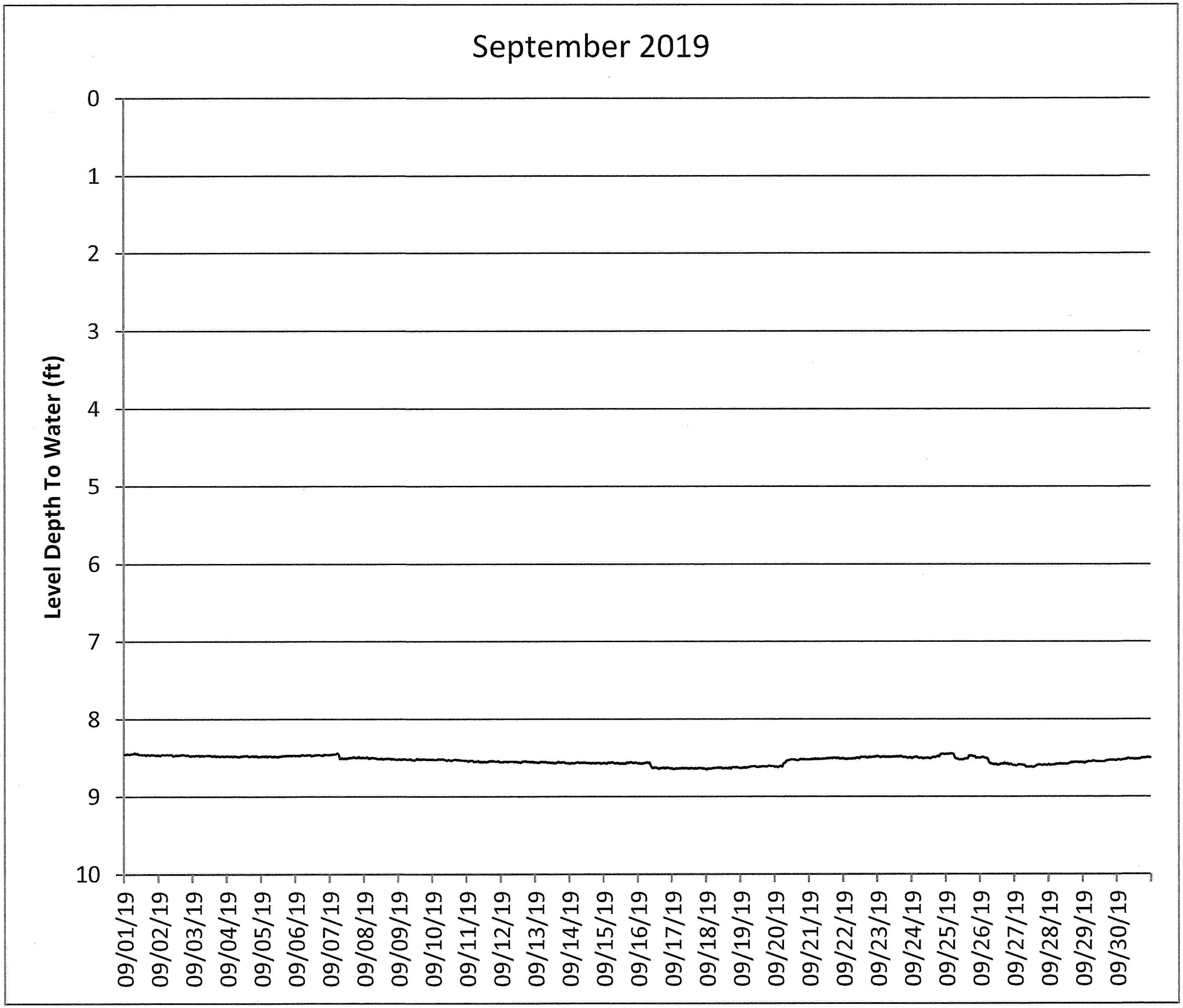
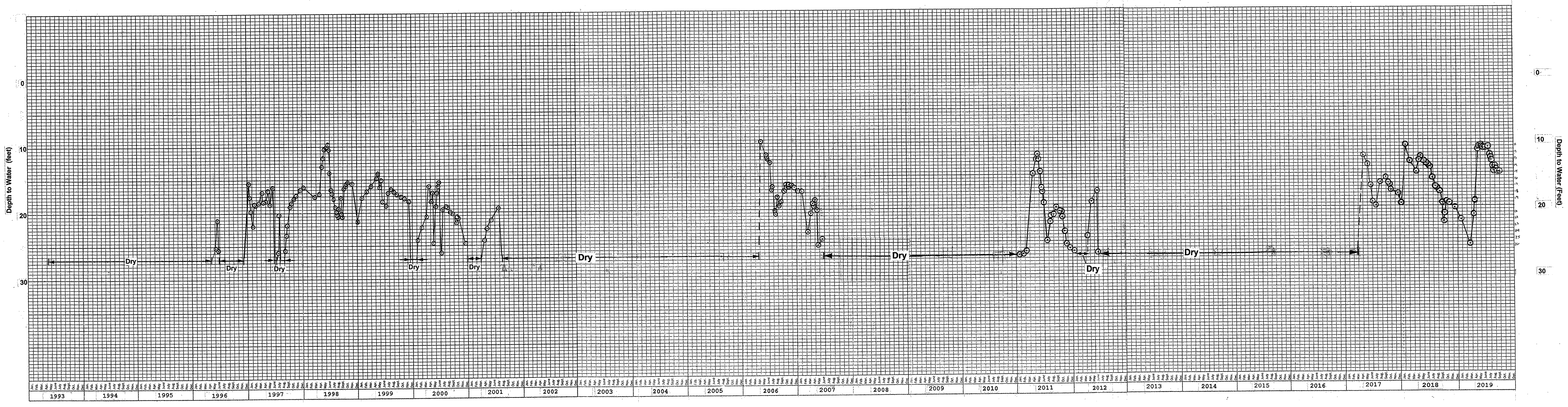


WATER LEVEL HYDROGRAPH FOR MW-5M

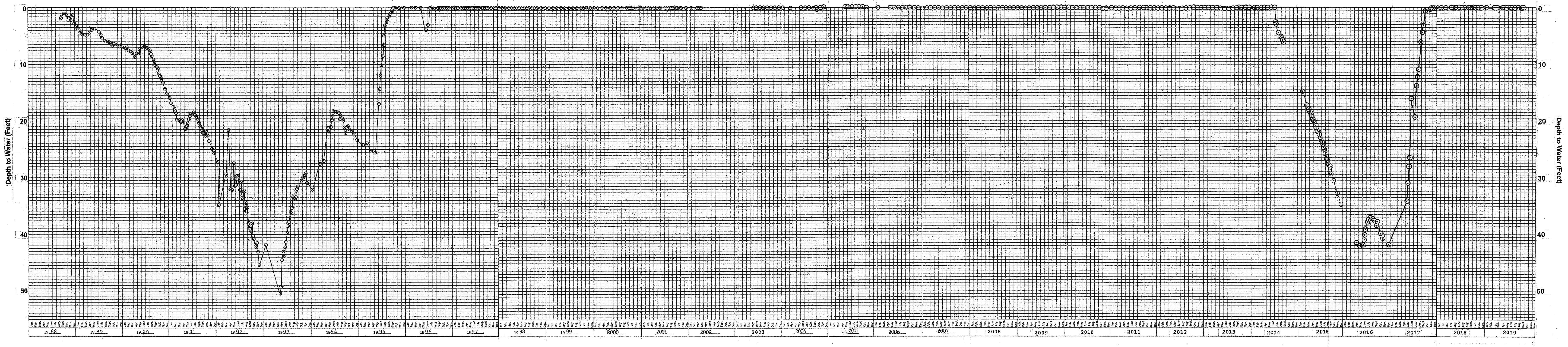


WATER LEVEL HYDROGRAPH FOR MW-5M

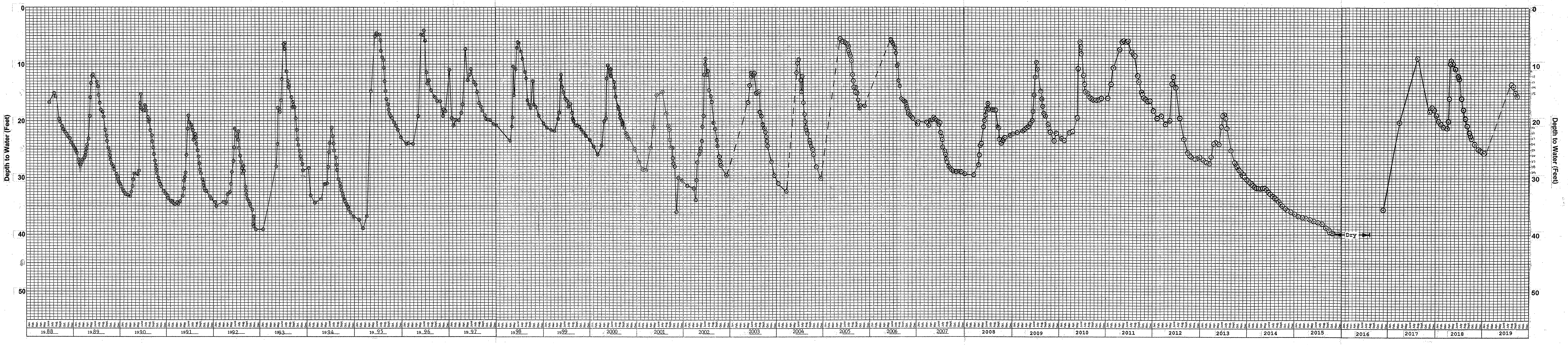
WATER-LEVEL HYDROGRAPH FOR WELL NO. 7



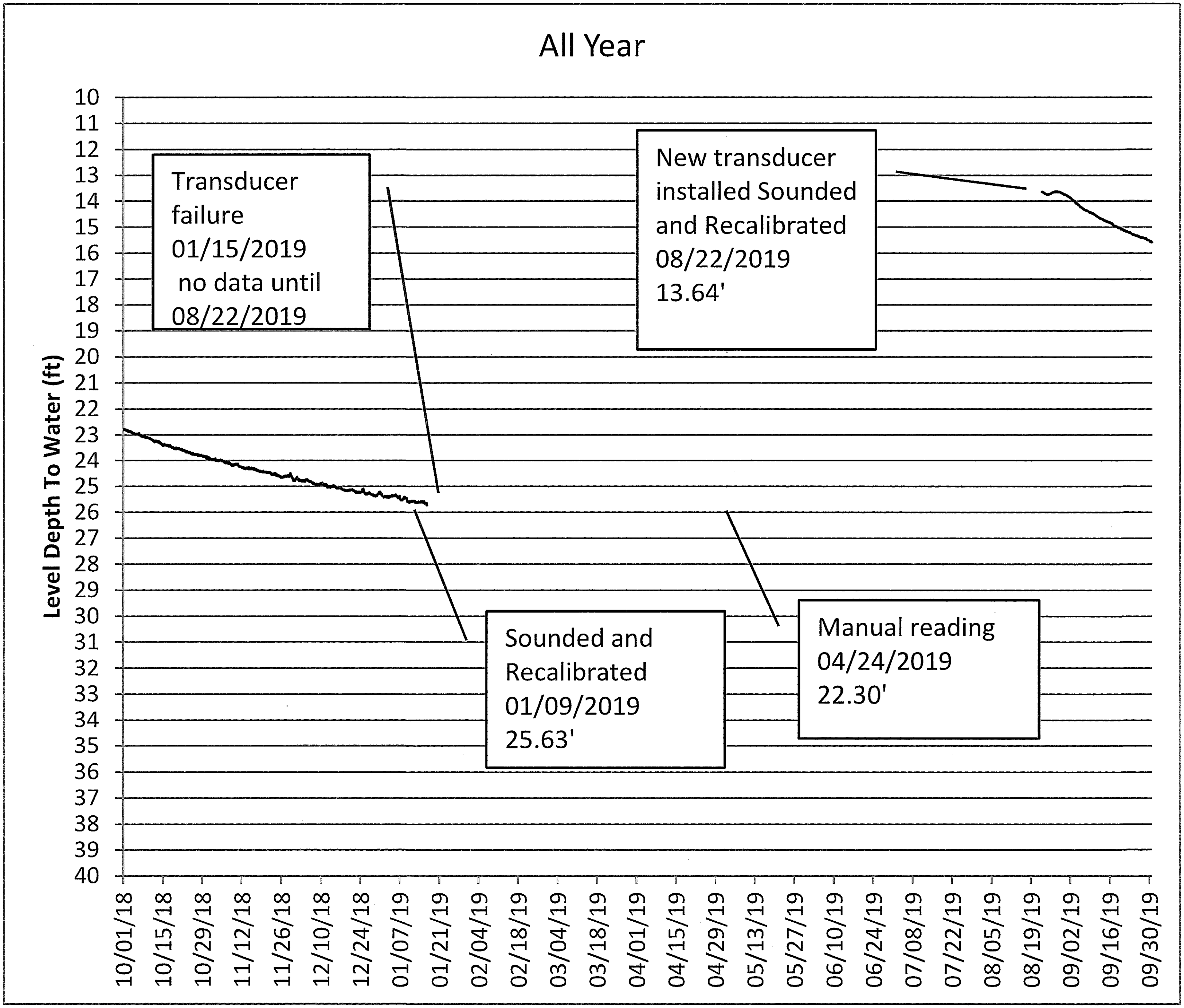
WATER-LEVEL HYDROGRAPH FOR WELL NO. 10M



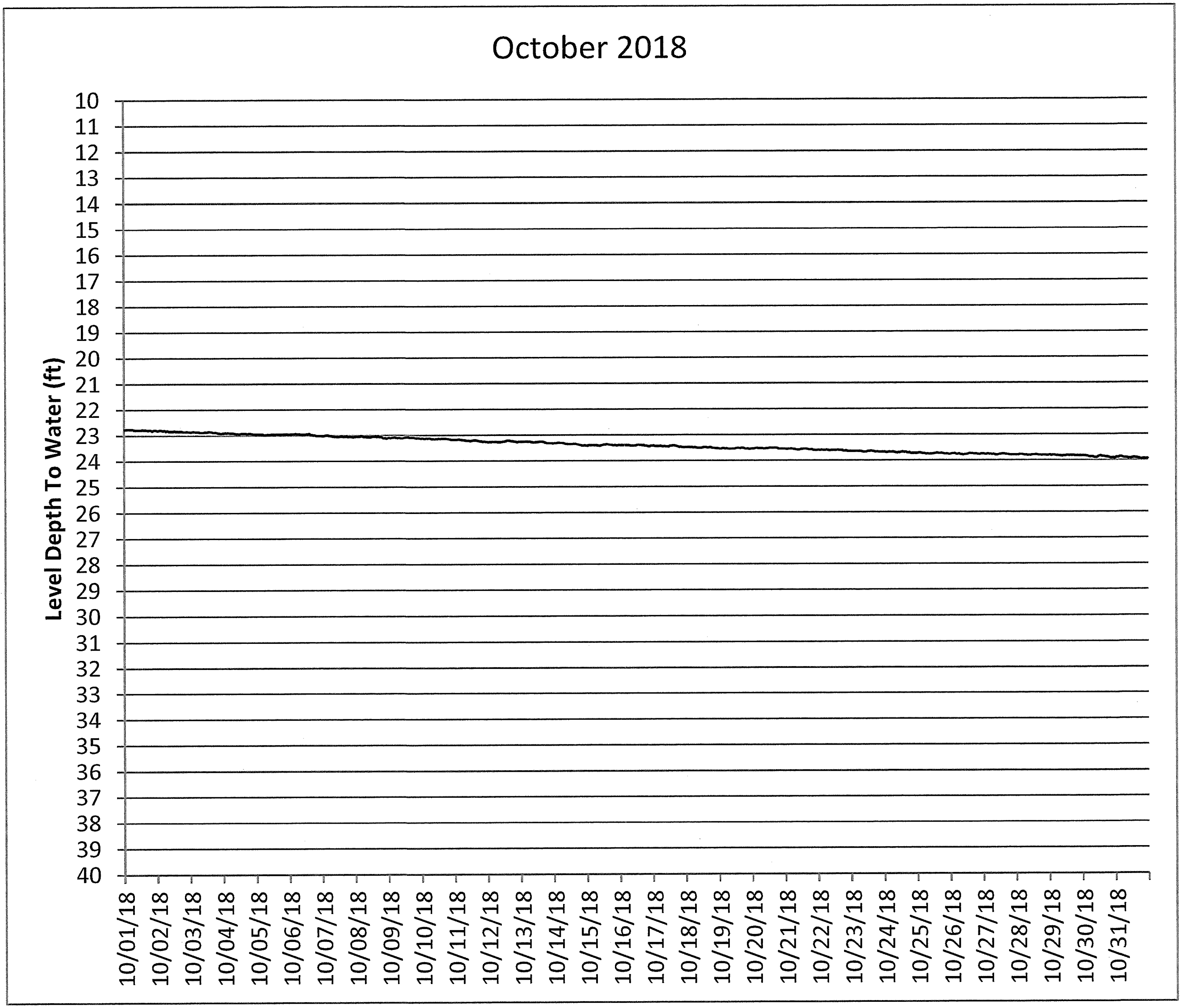
WATER-LEVEL HYDROGRAPH FOR WELL NO. 11



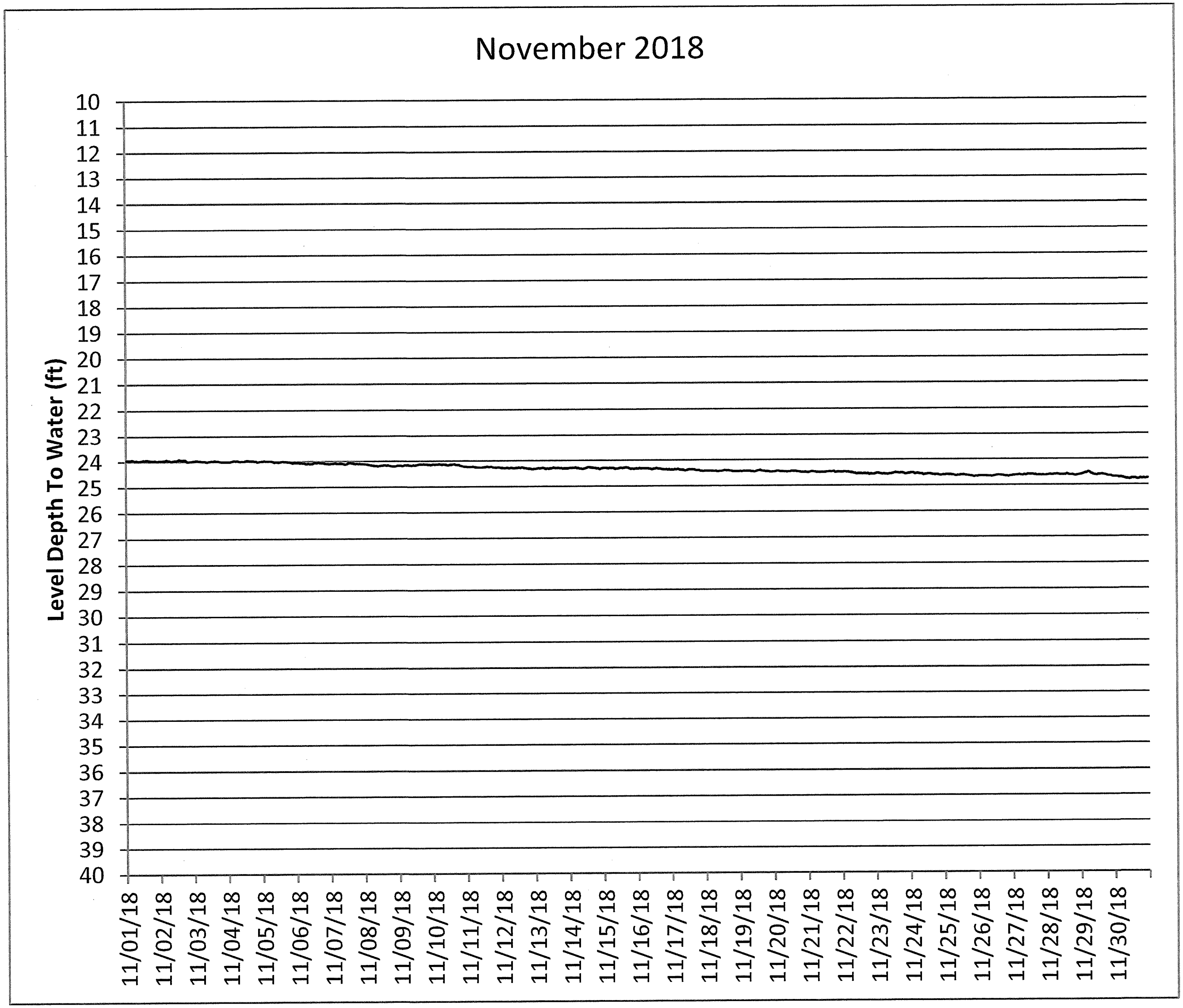
WATER-LEVEL HYDROGRAPH FOR WELL NO. 11M



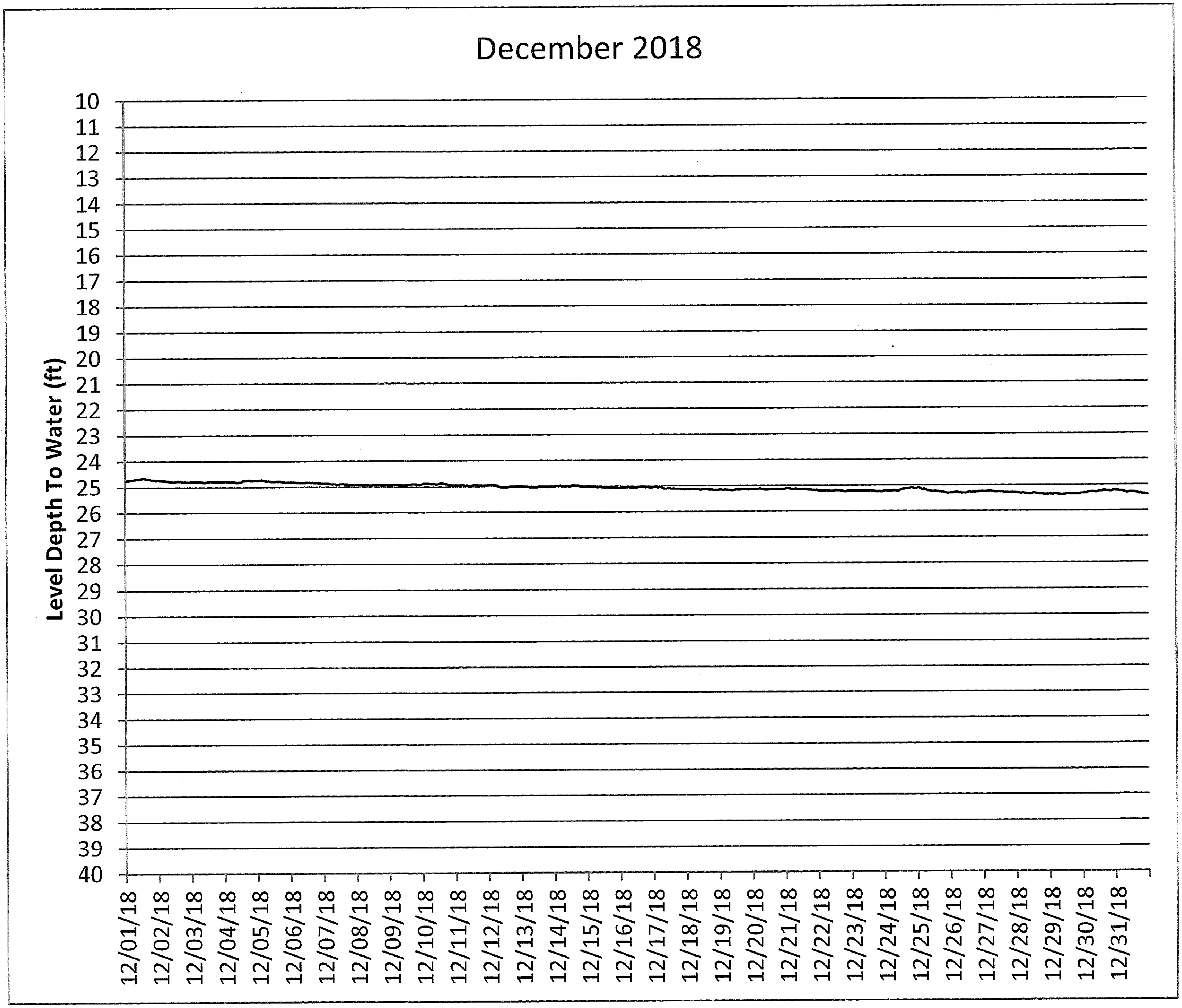
WATER LEVEL HYDROGRAPH FOR MW-11M



WATER LEVEL HYDROGRAPH FOR MW-11M



WATER LEVEL HYDROGRAPH FOR MW-11M



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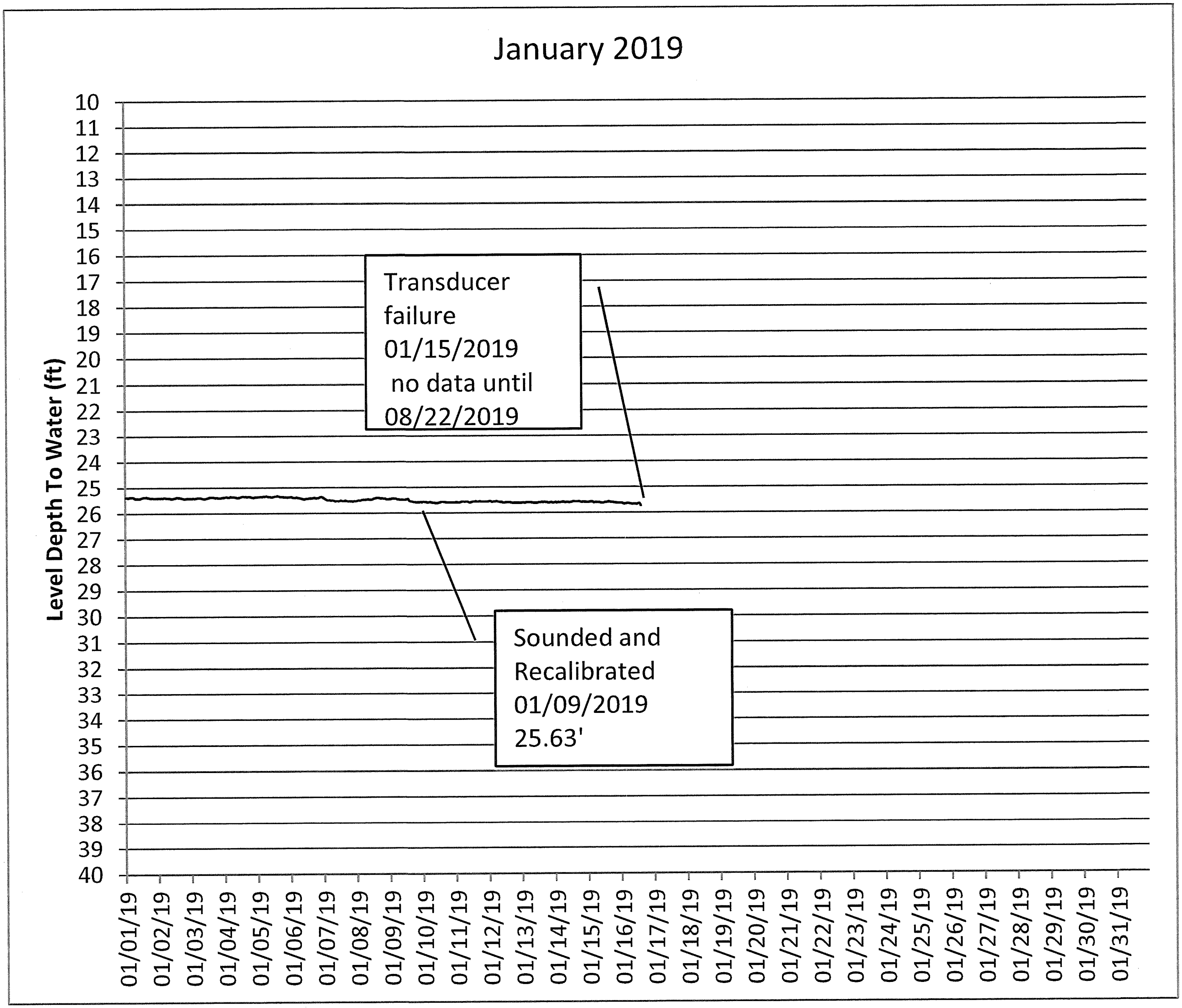

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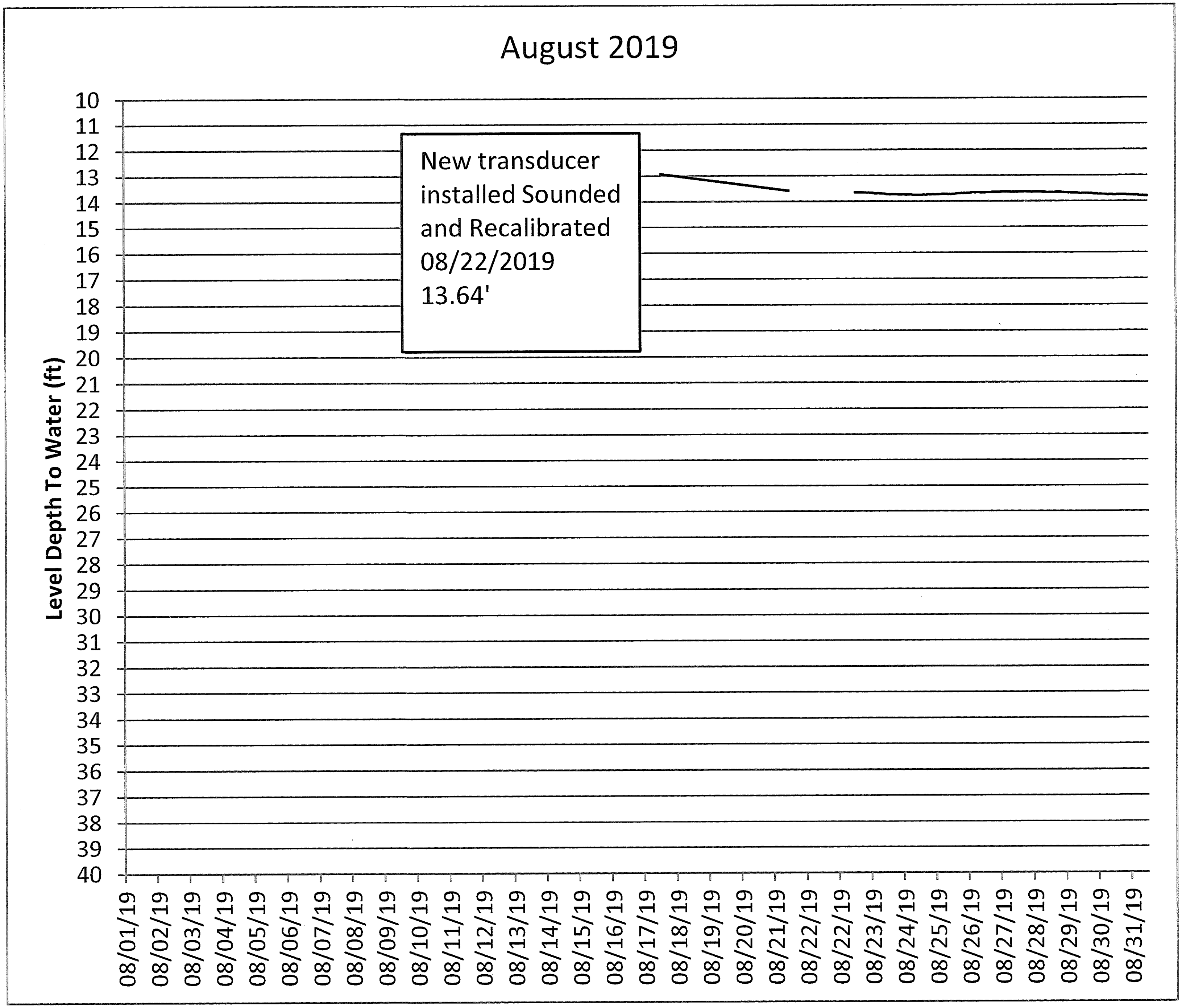

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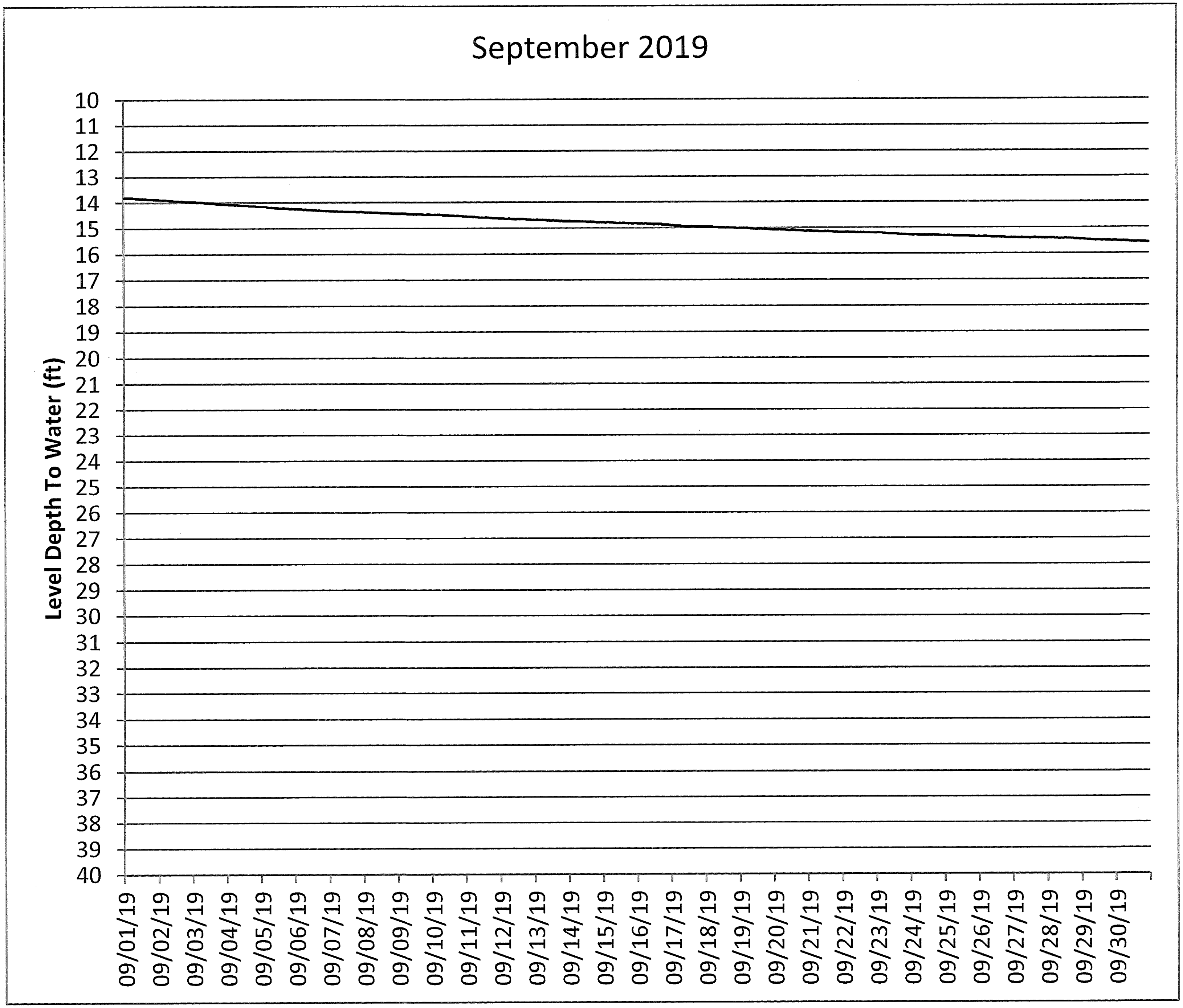

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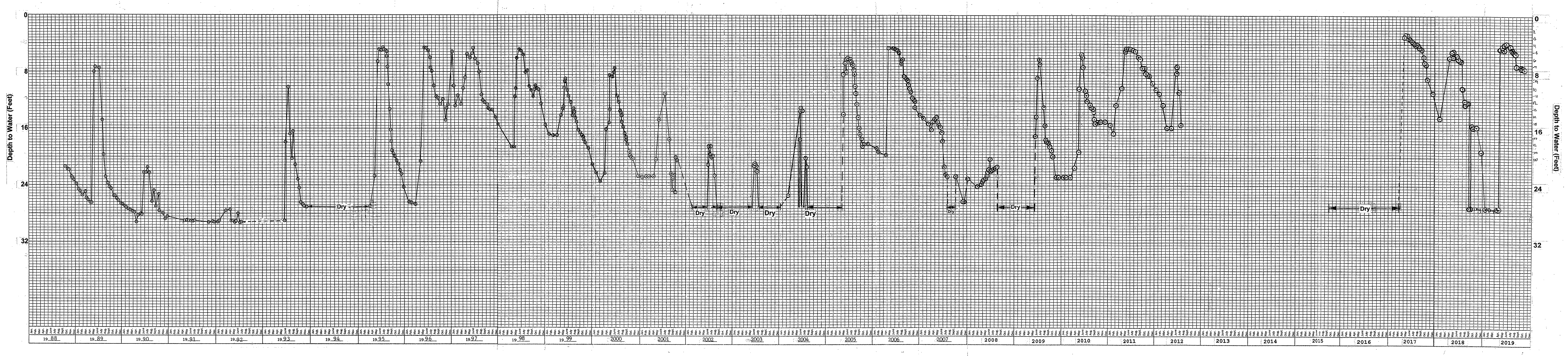
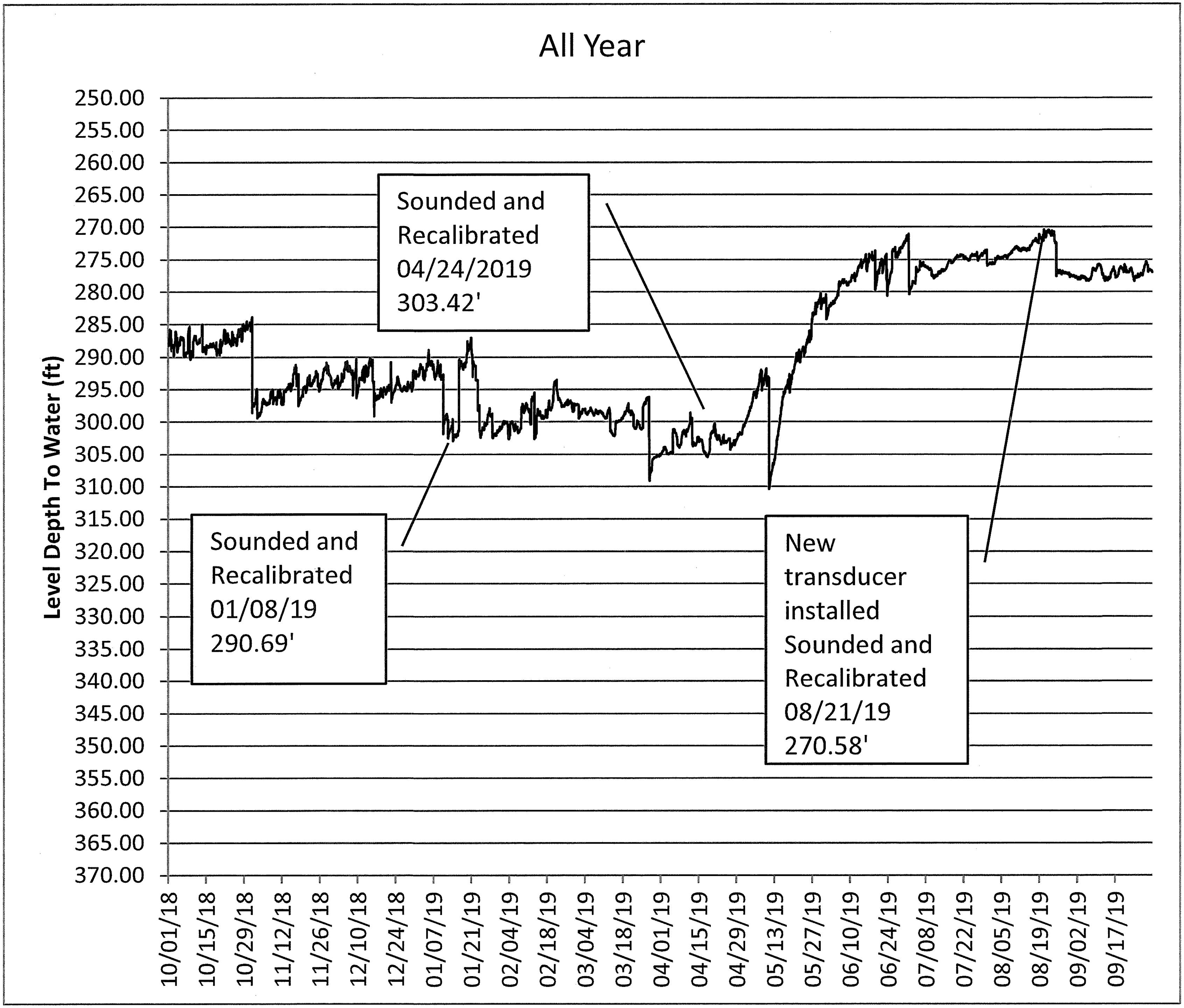
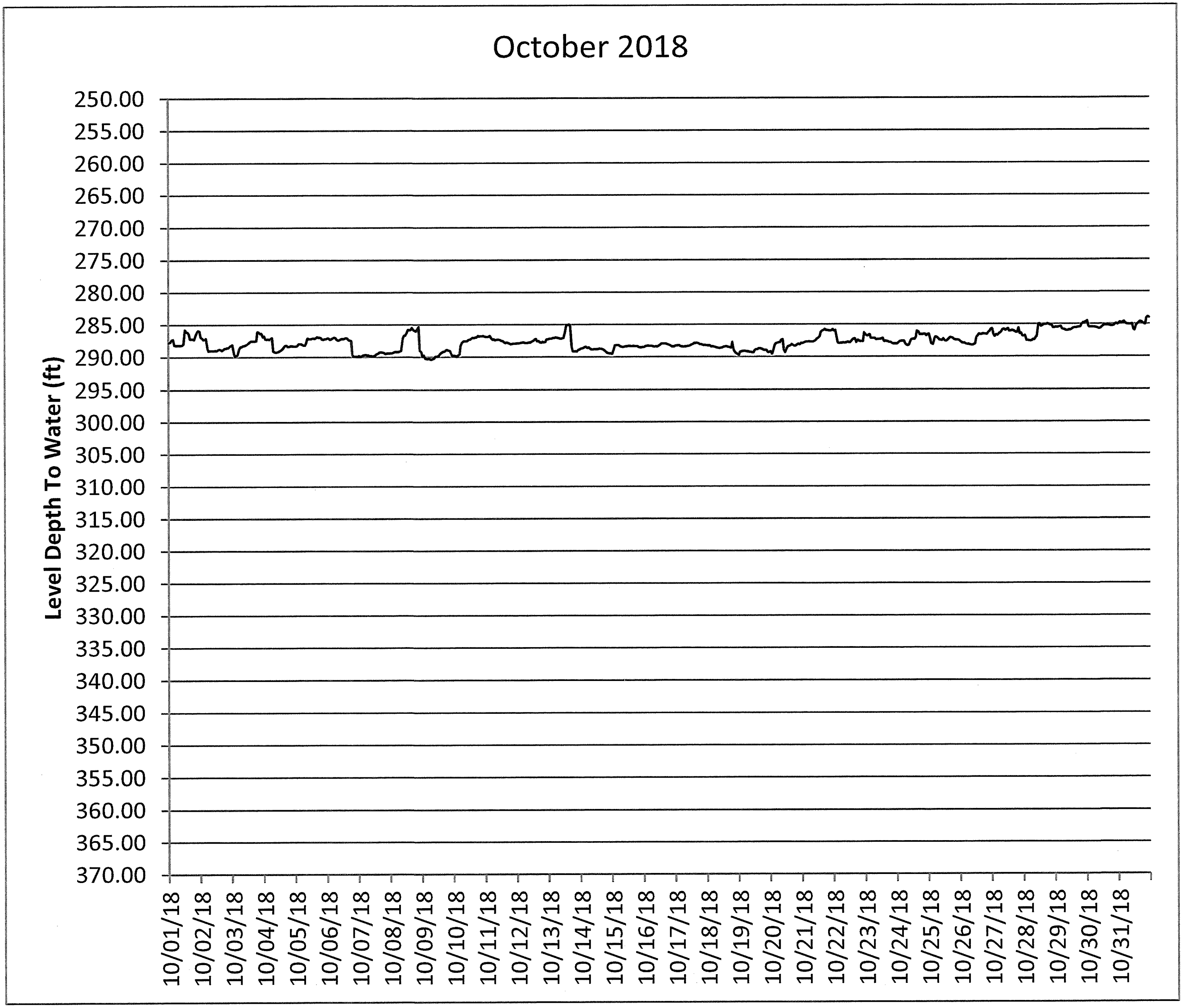


WATER-LEVEL HYDROGRAPH FOR WELL NO. 12M



WATER LEVEL HYDROGRAPH FOR MW-14M



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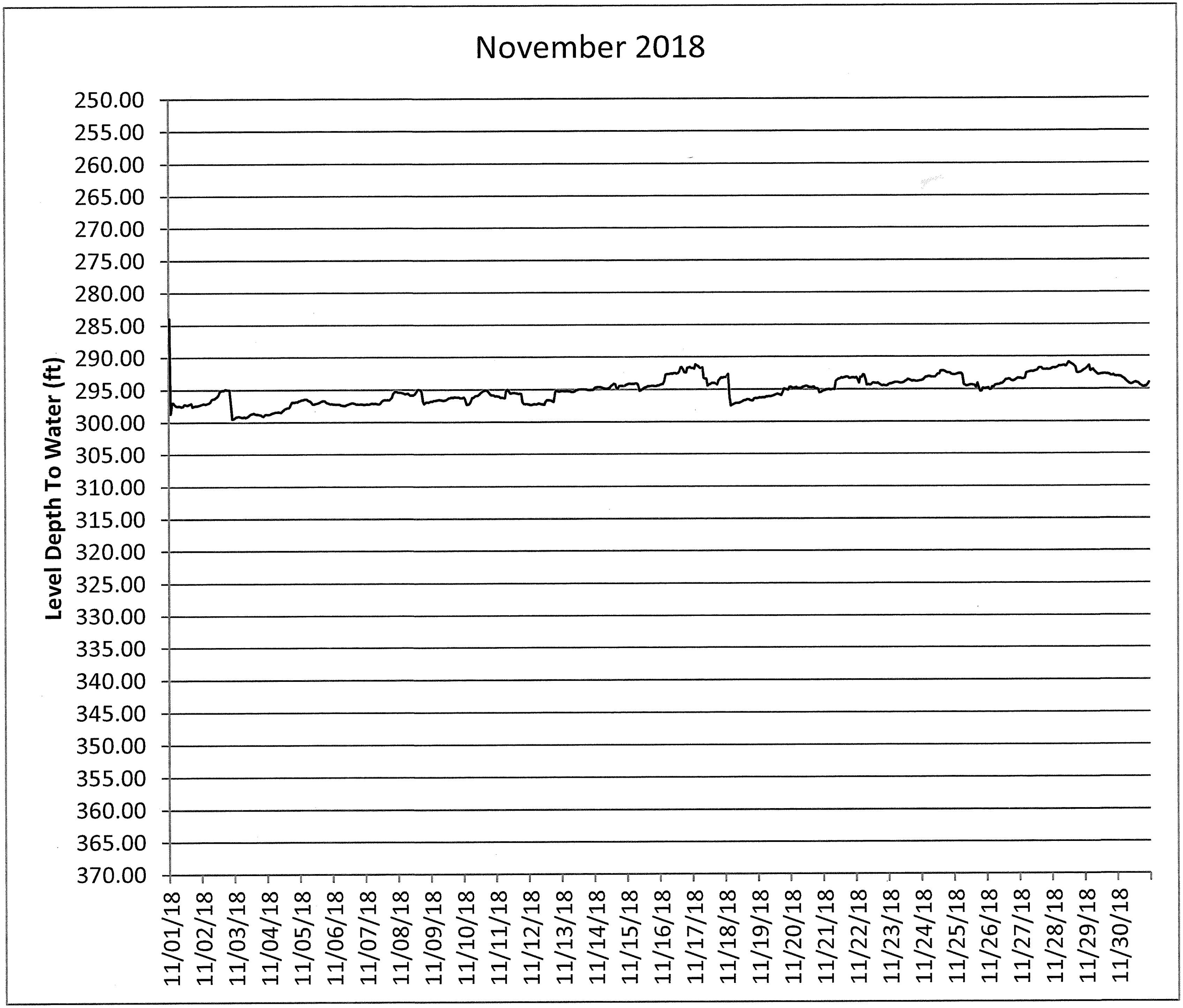

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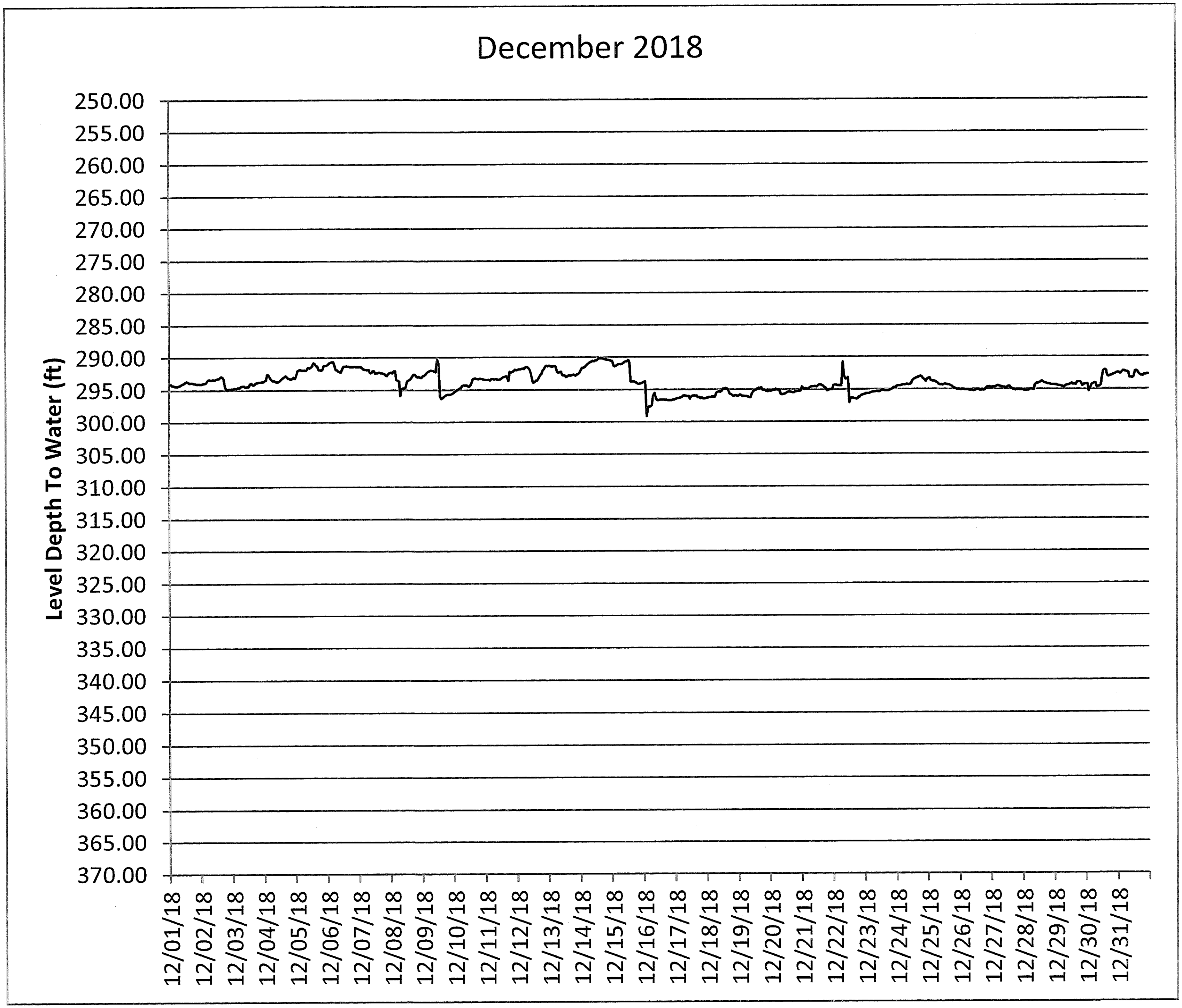

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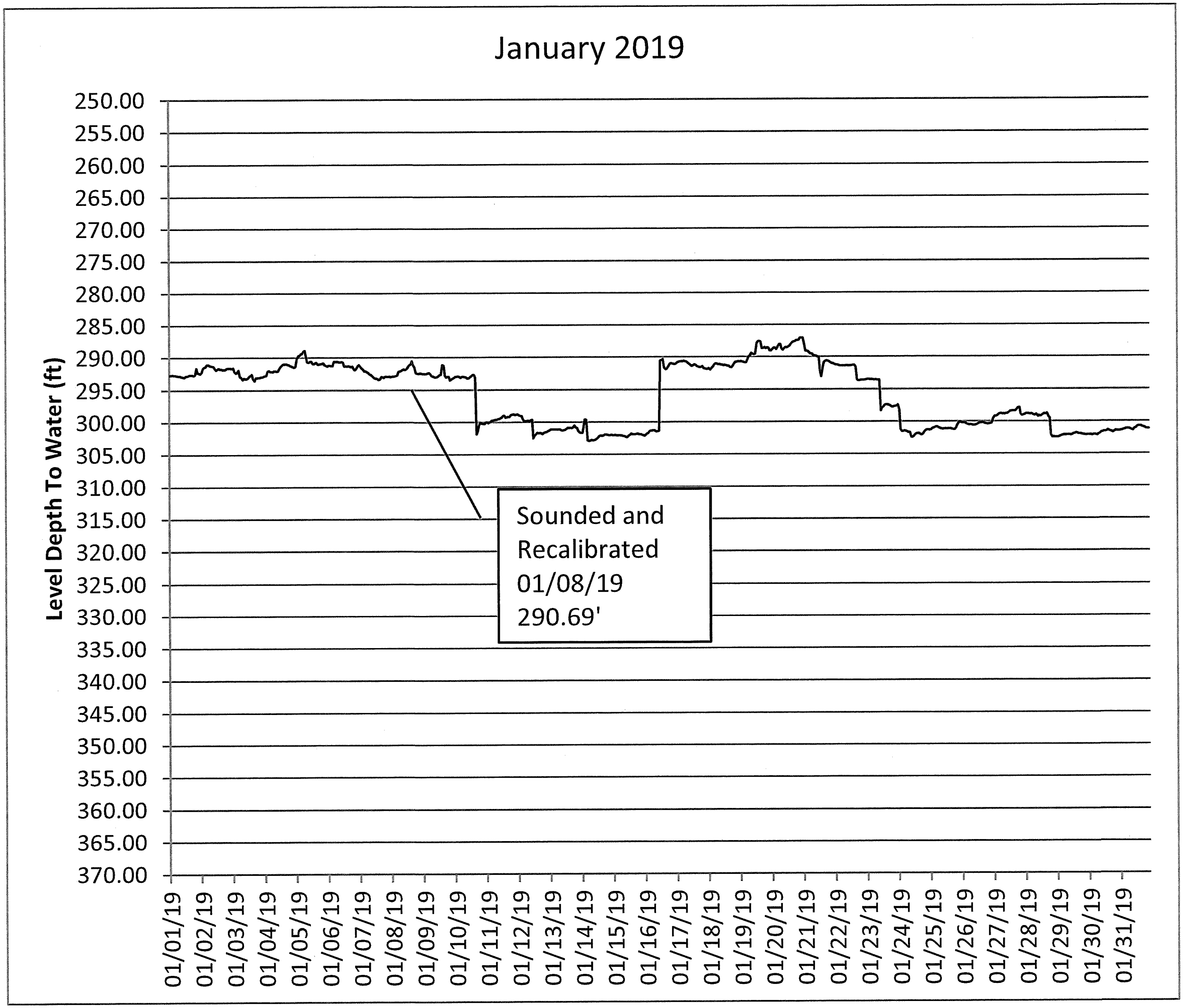

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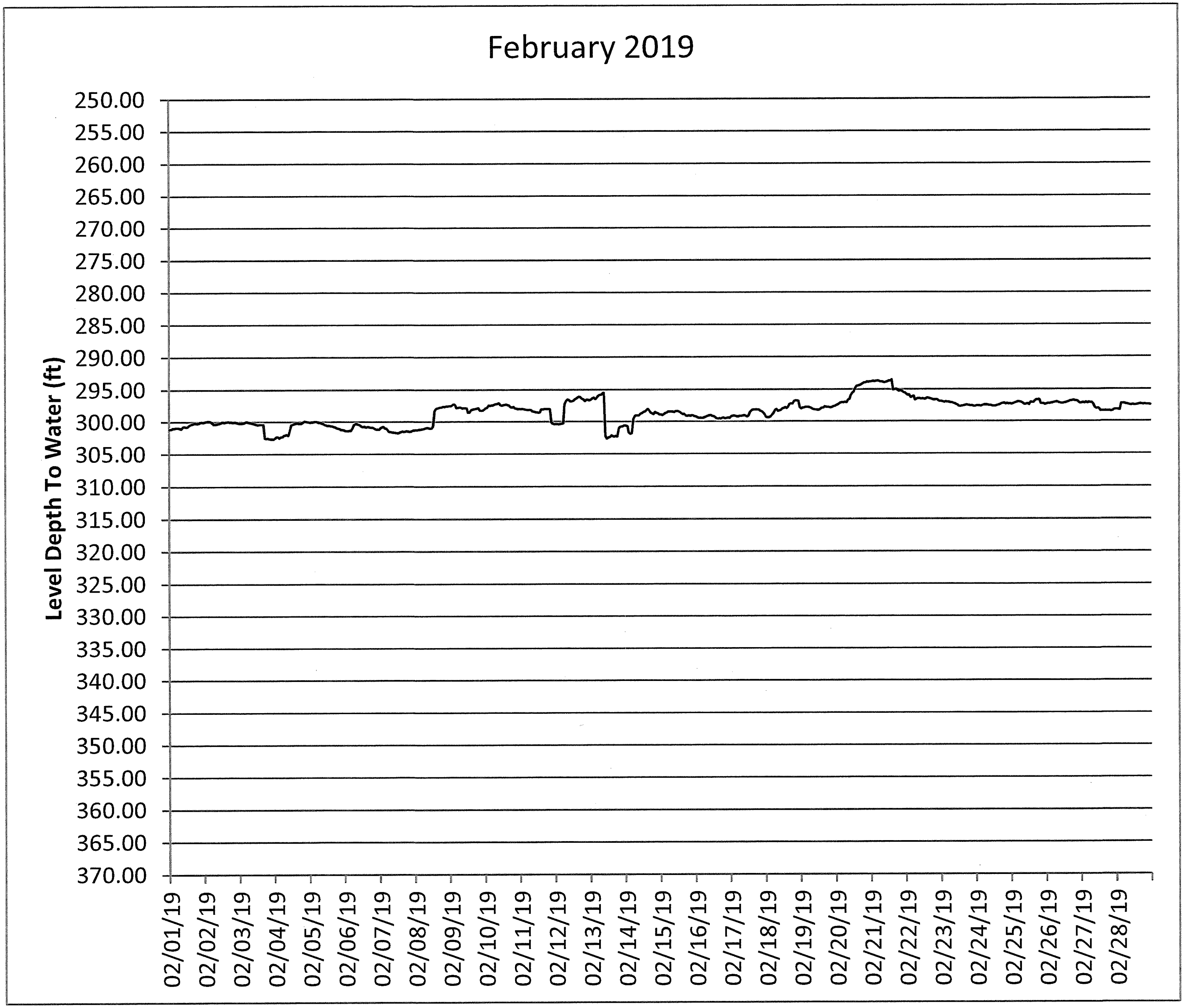

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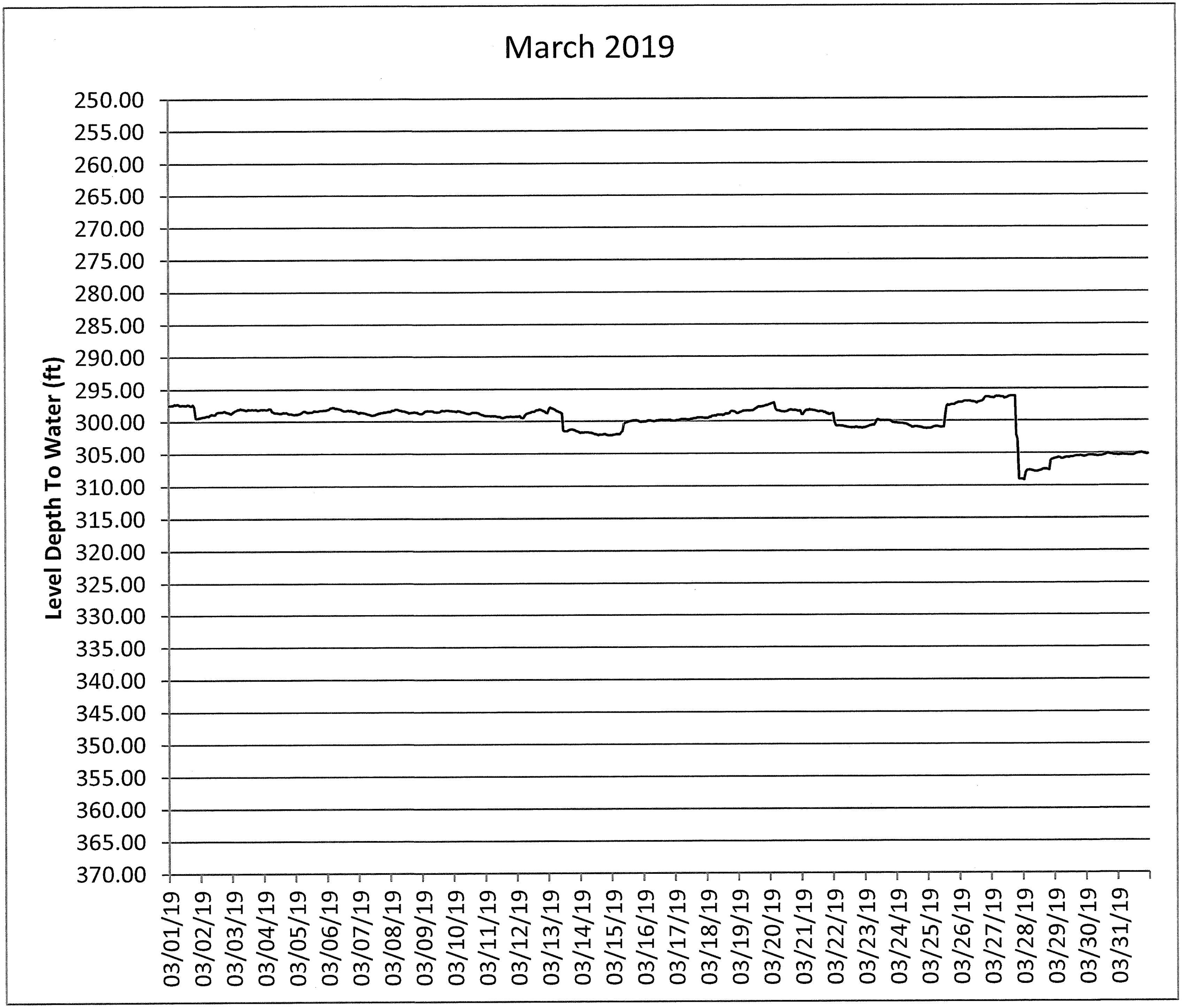

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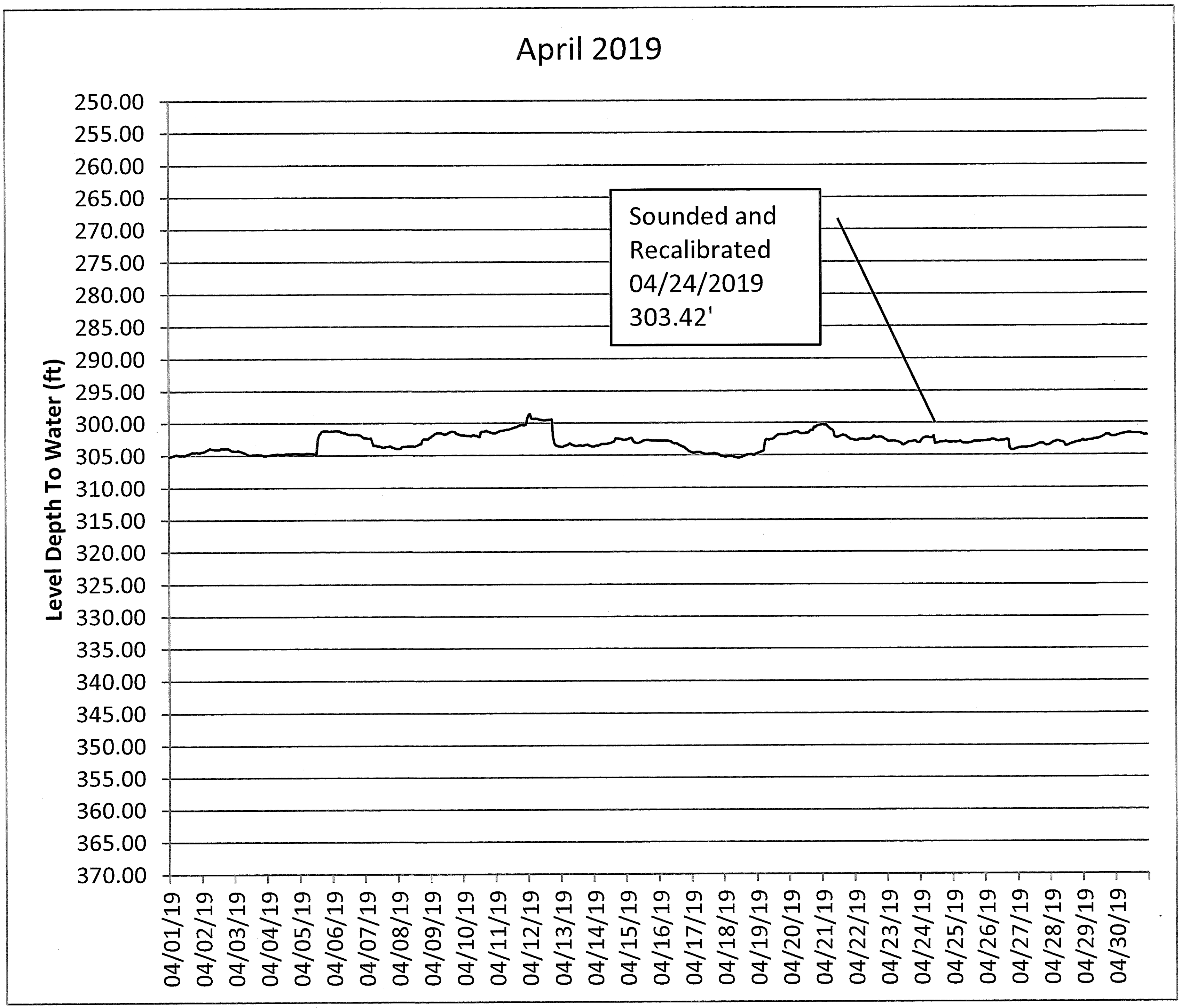

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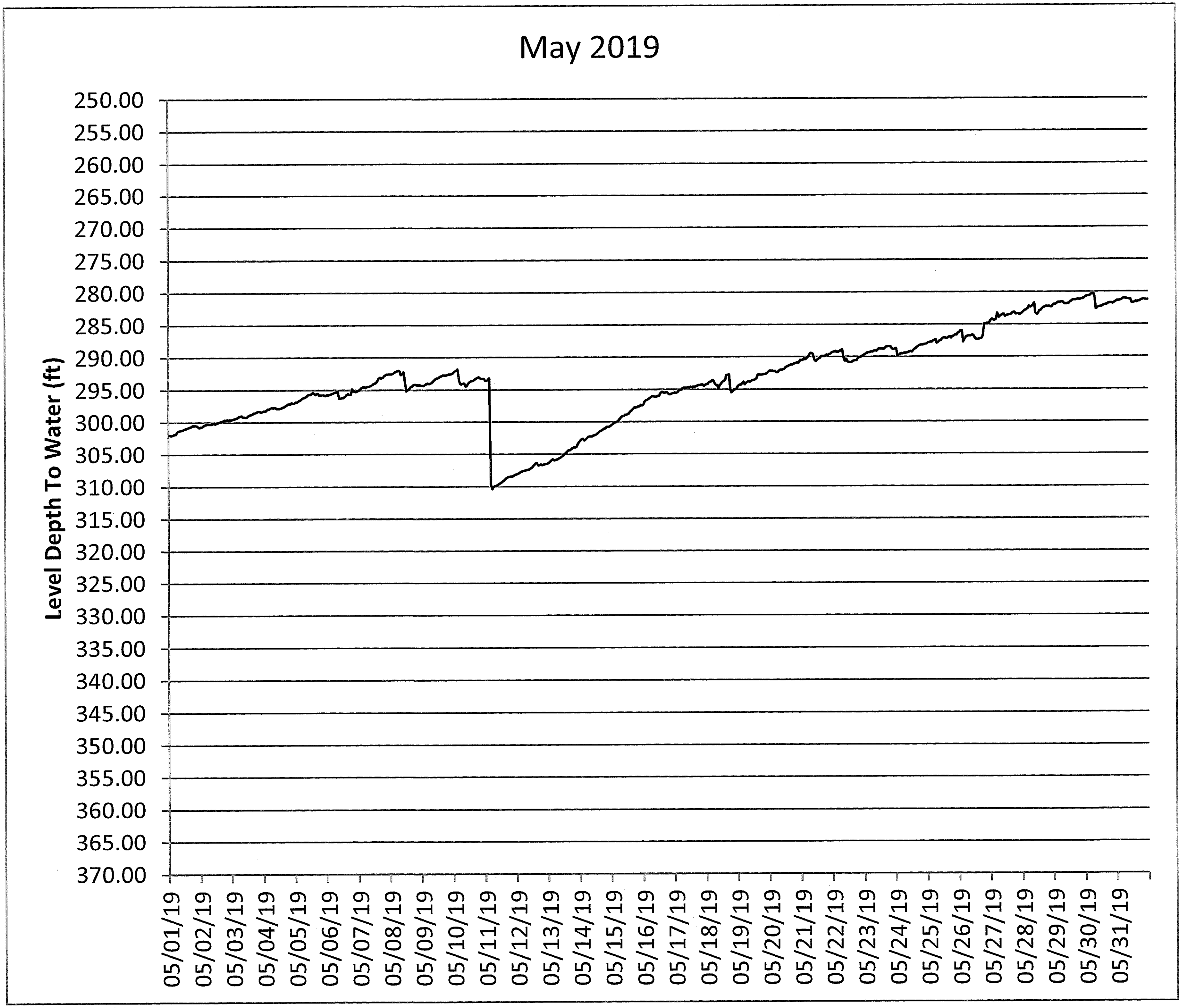

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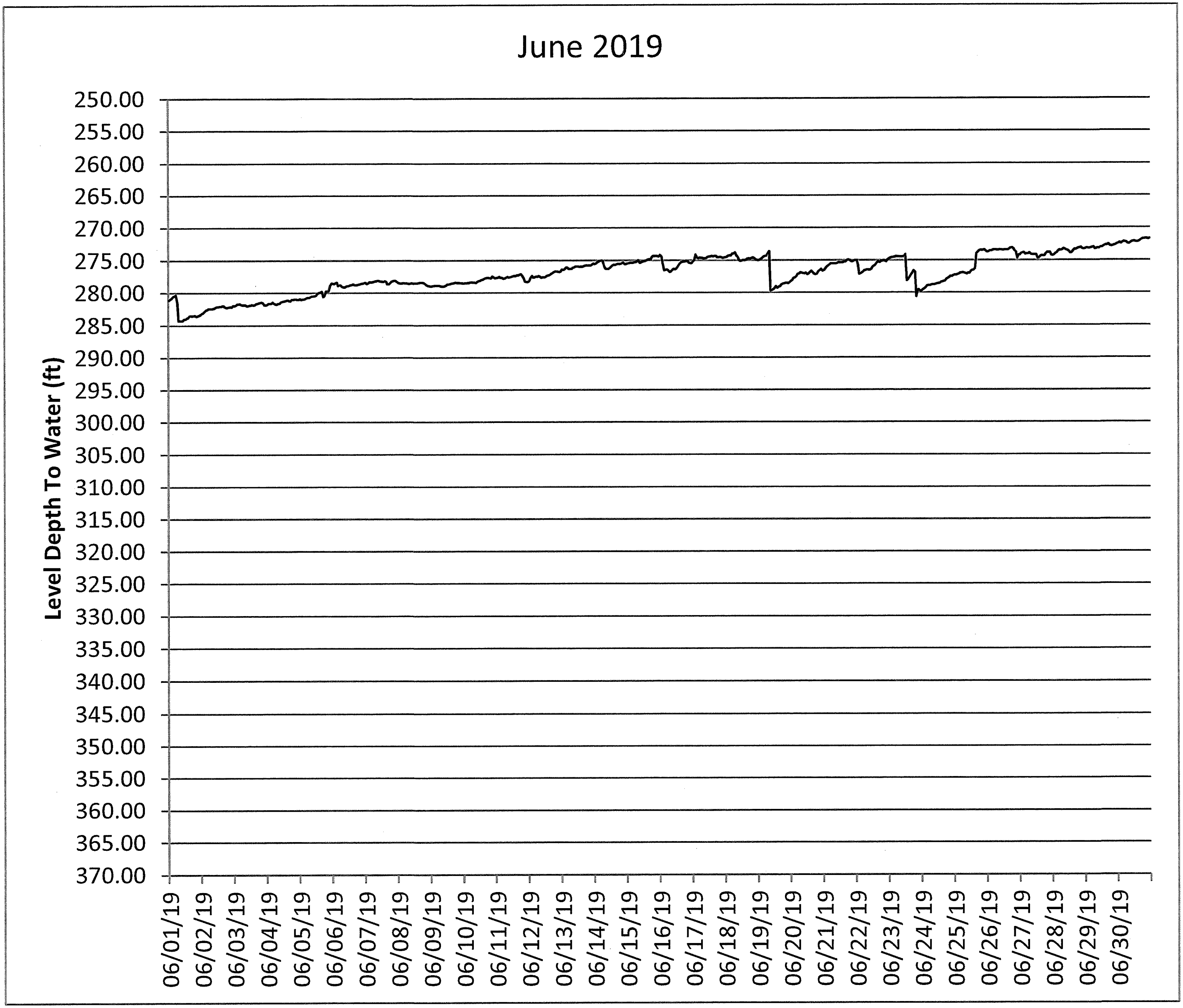

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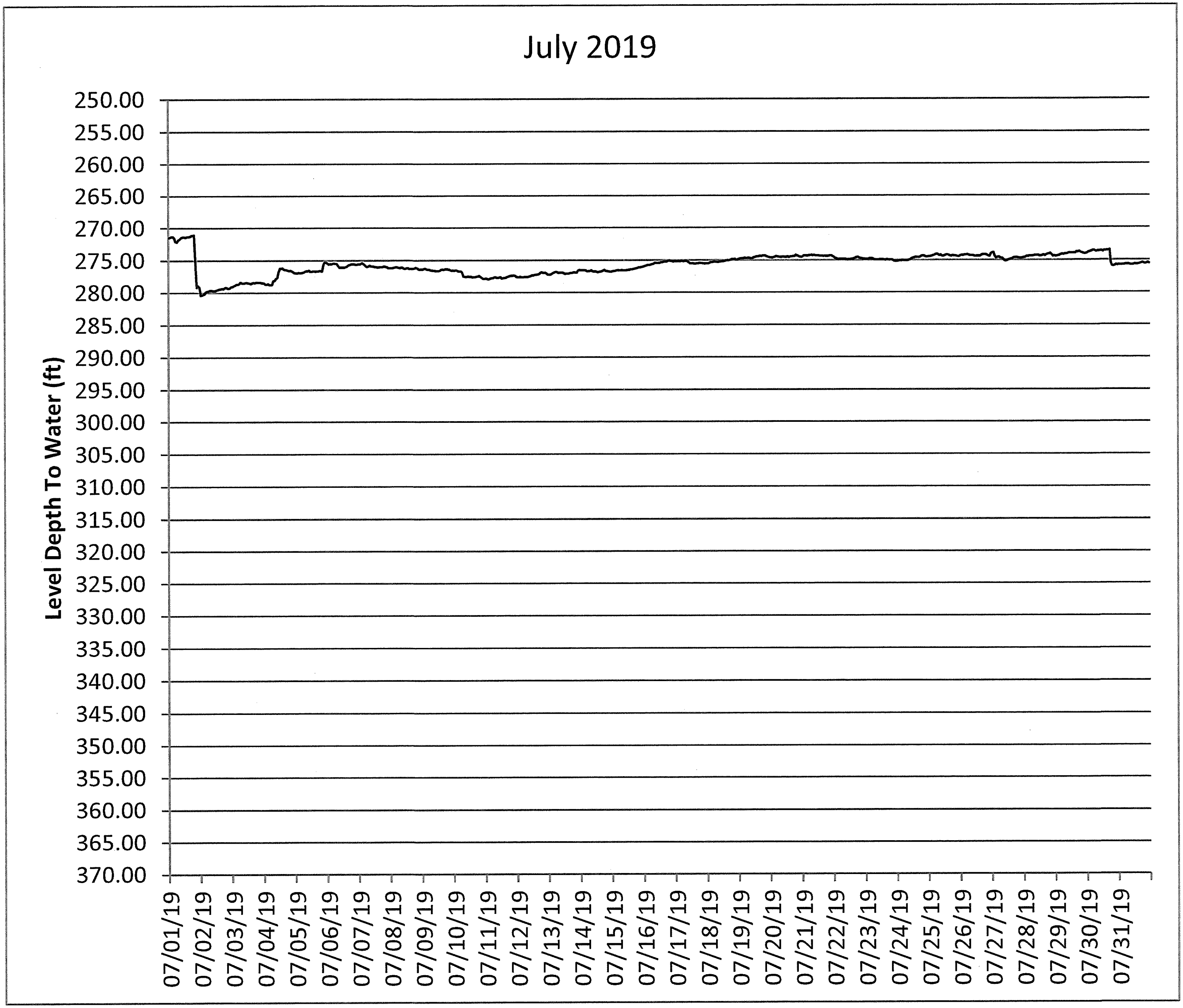

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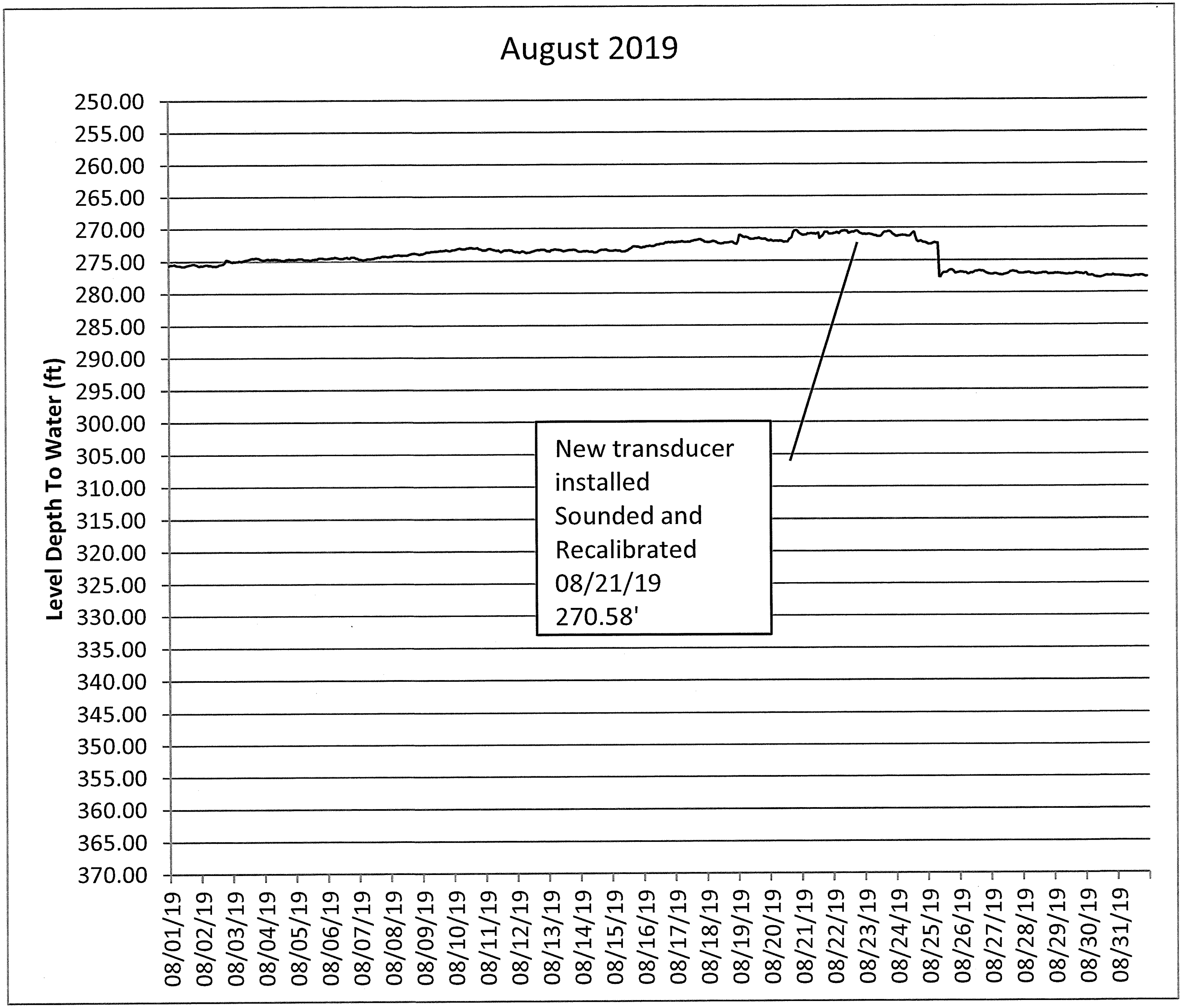

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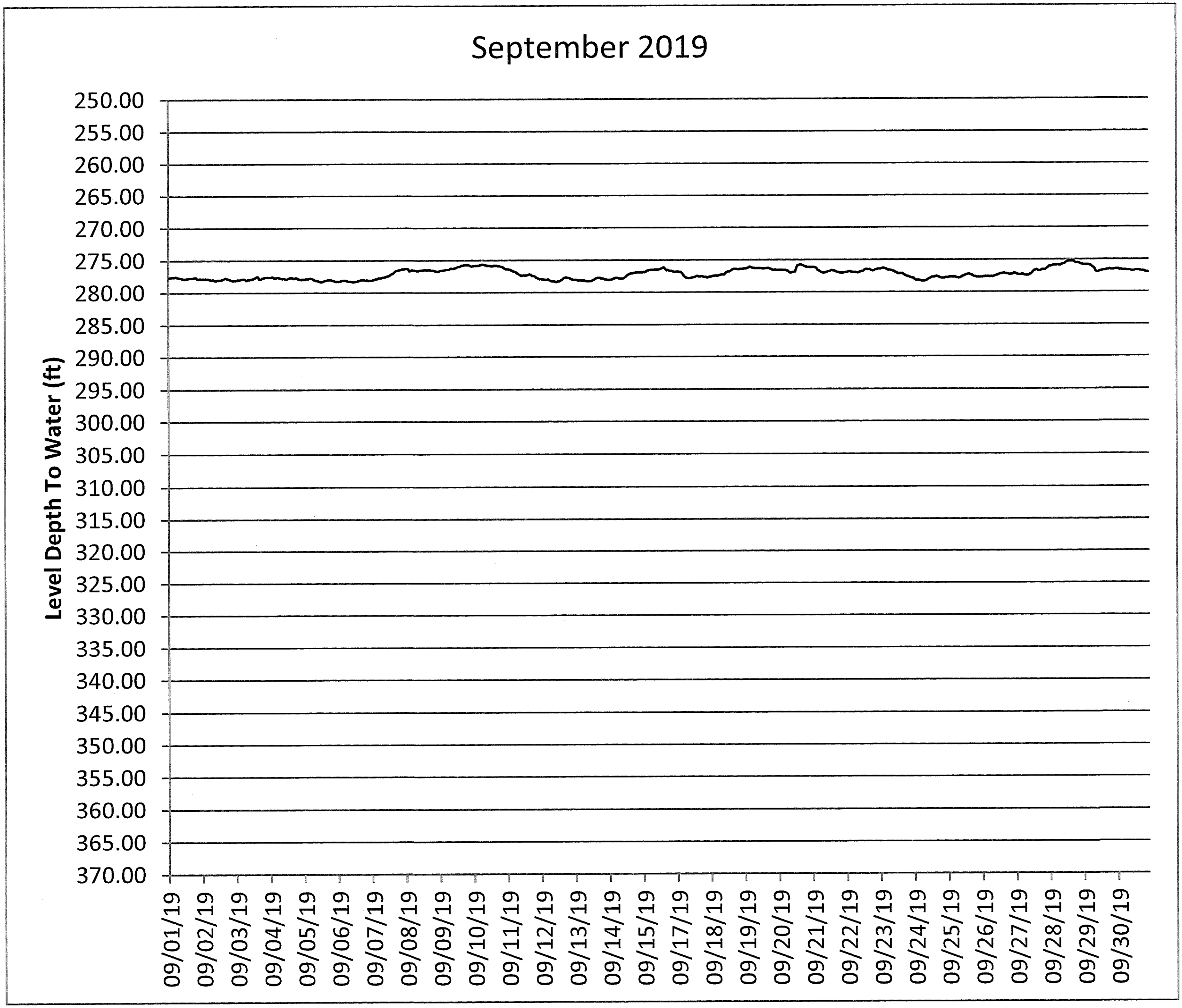

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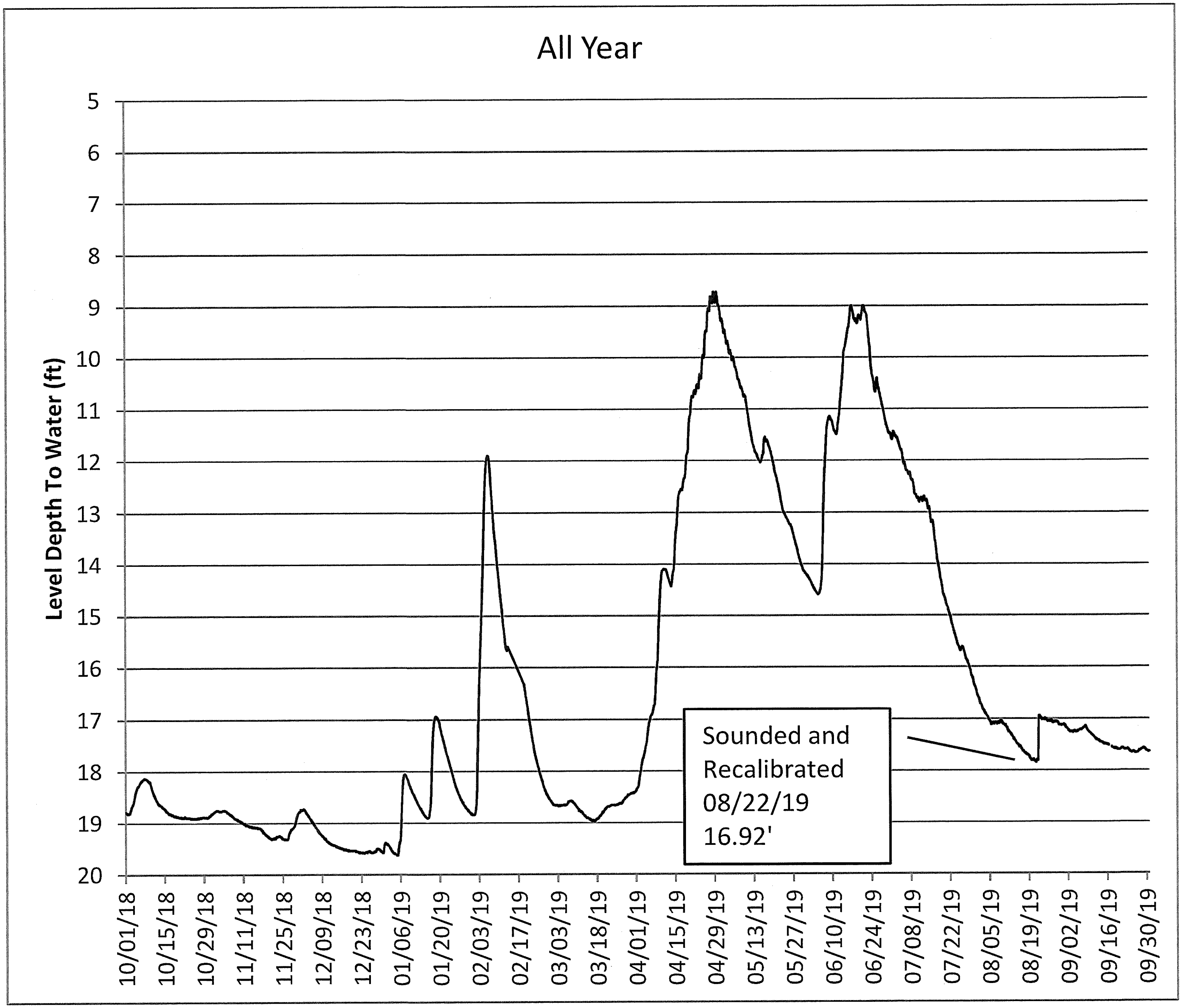

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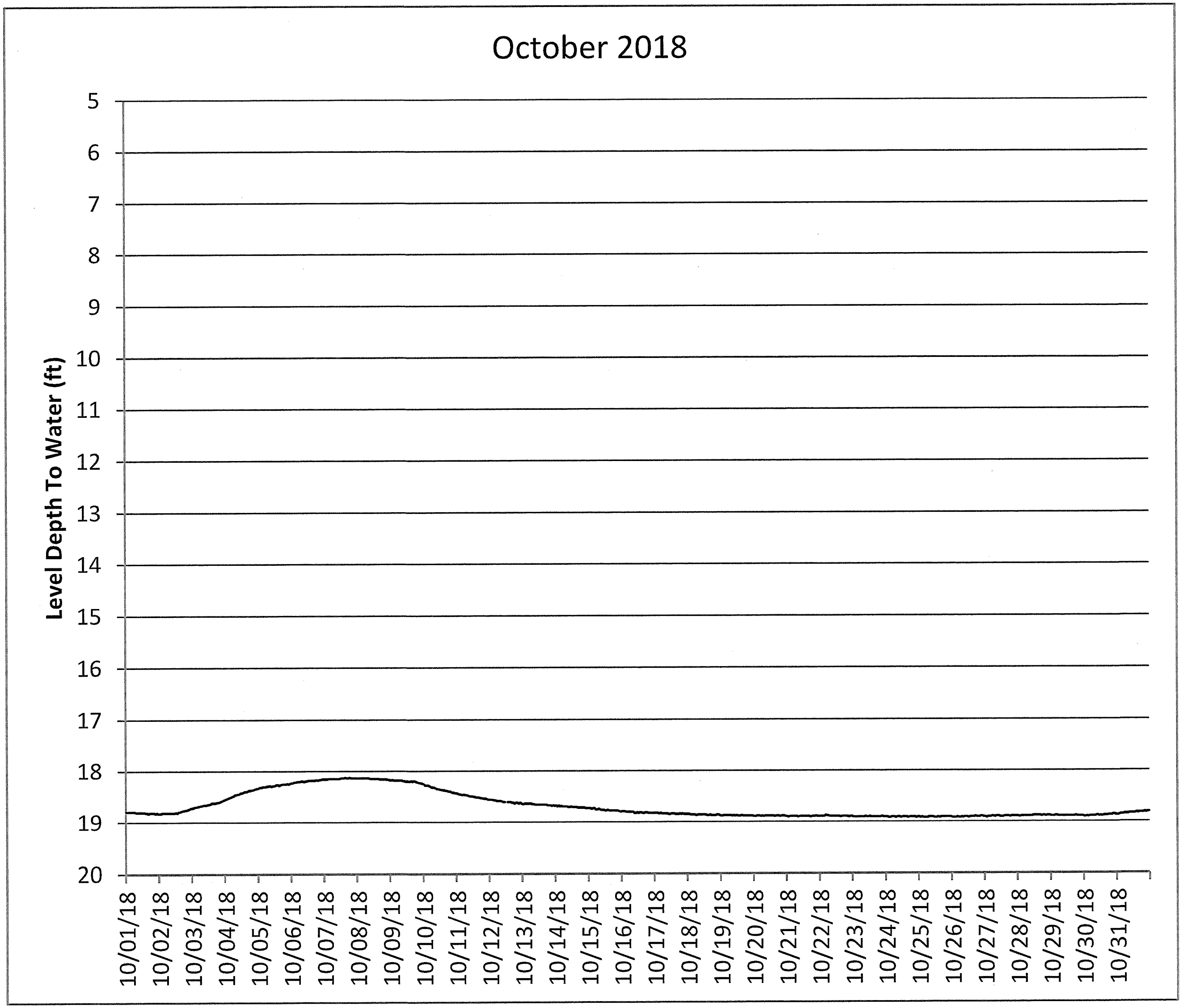

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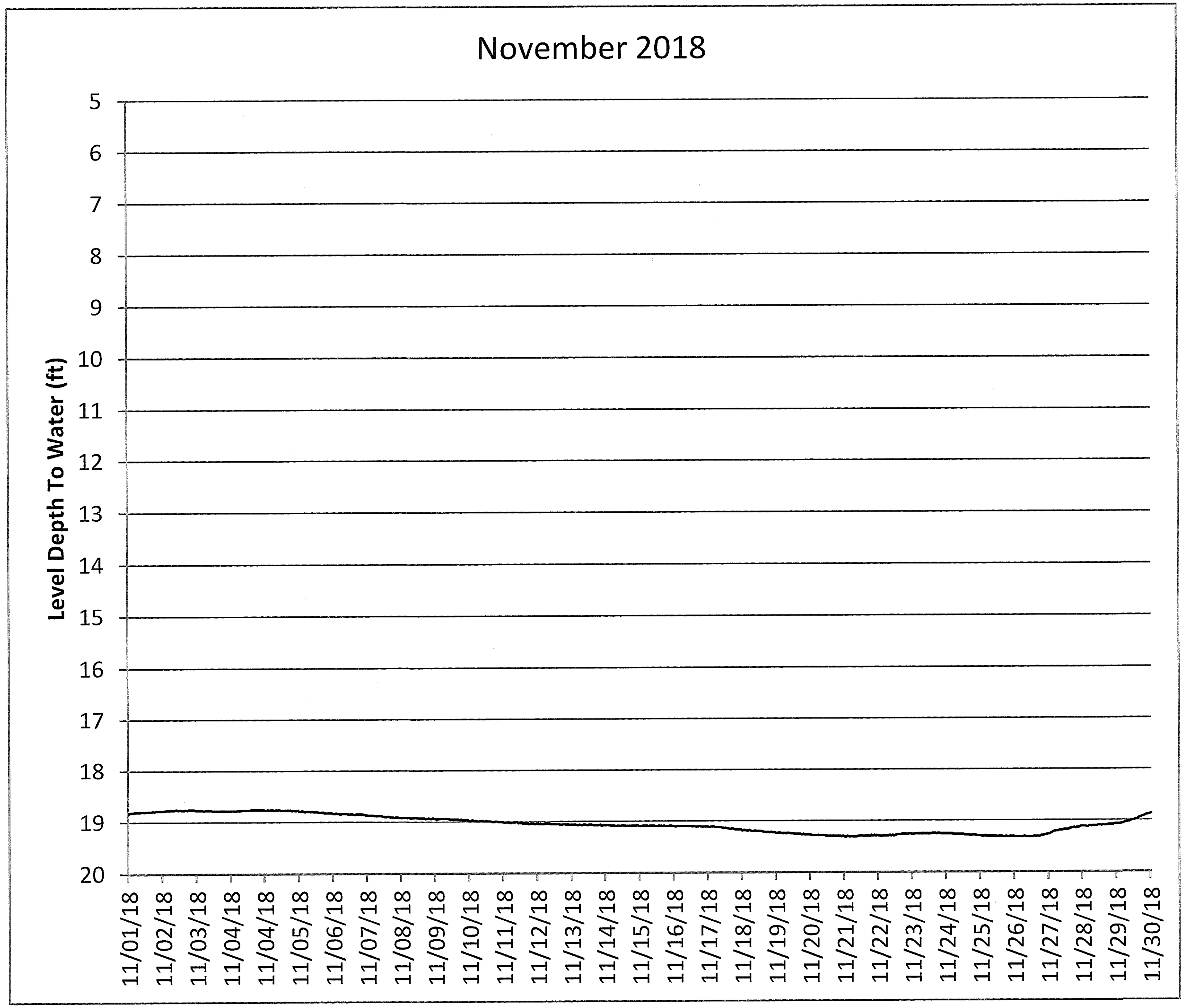

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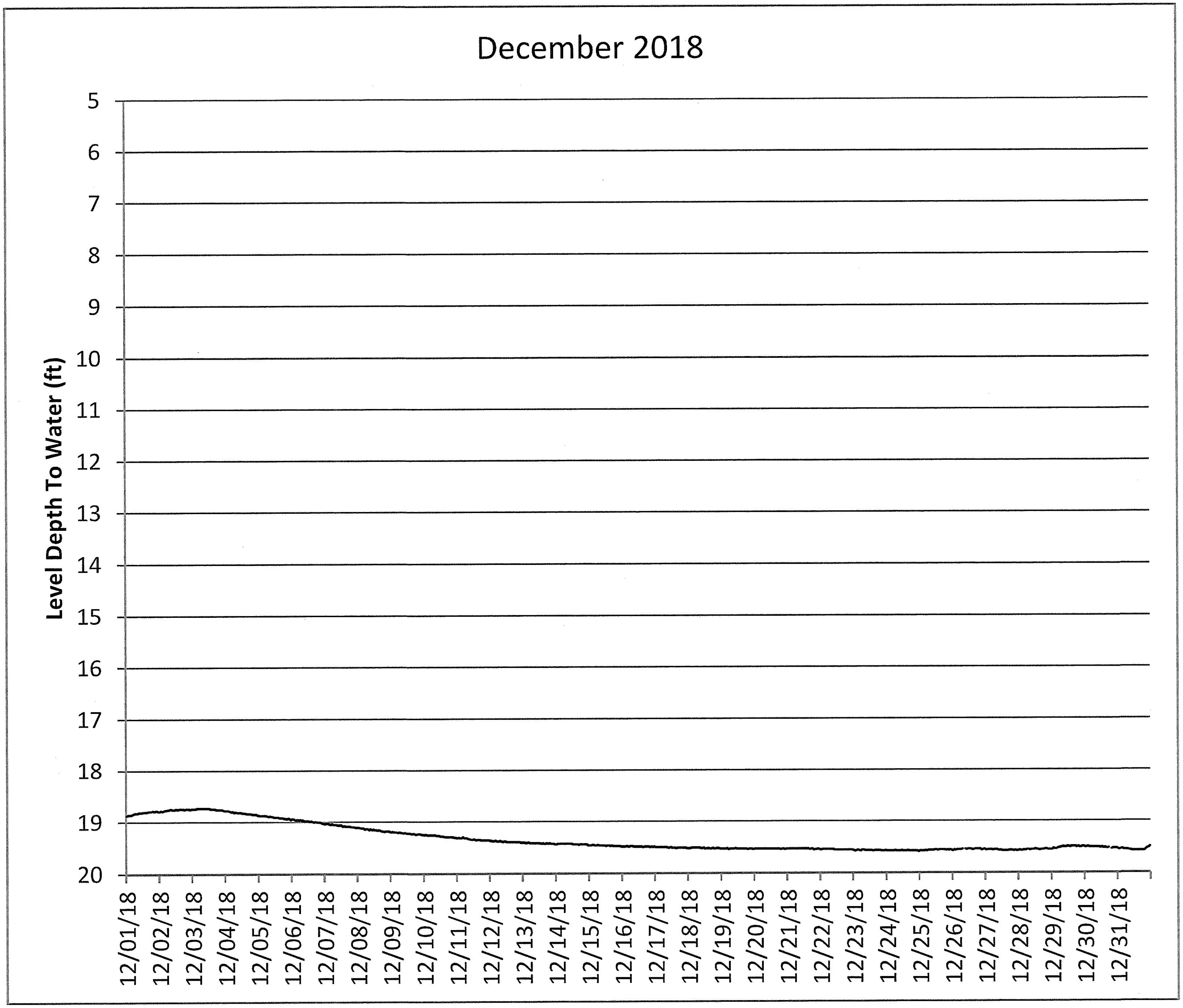

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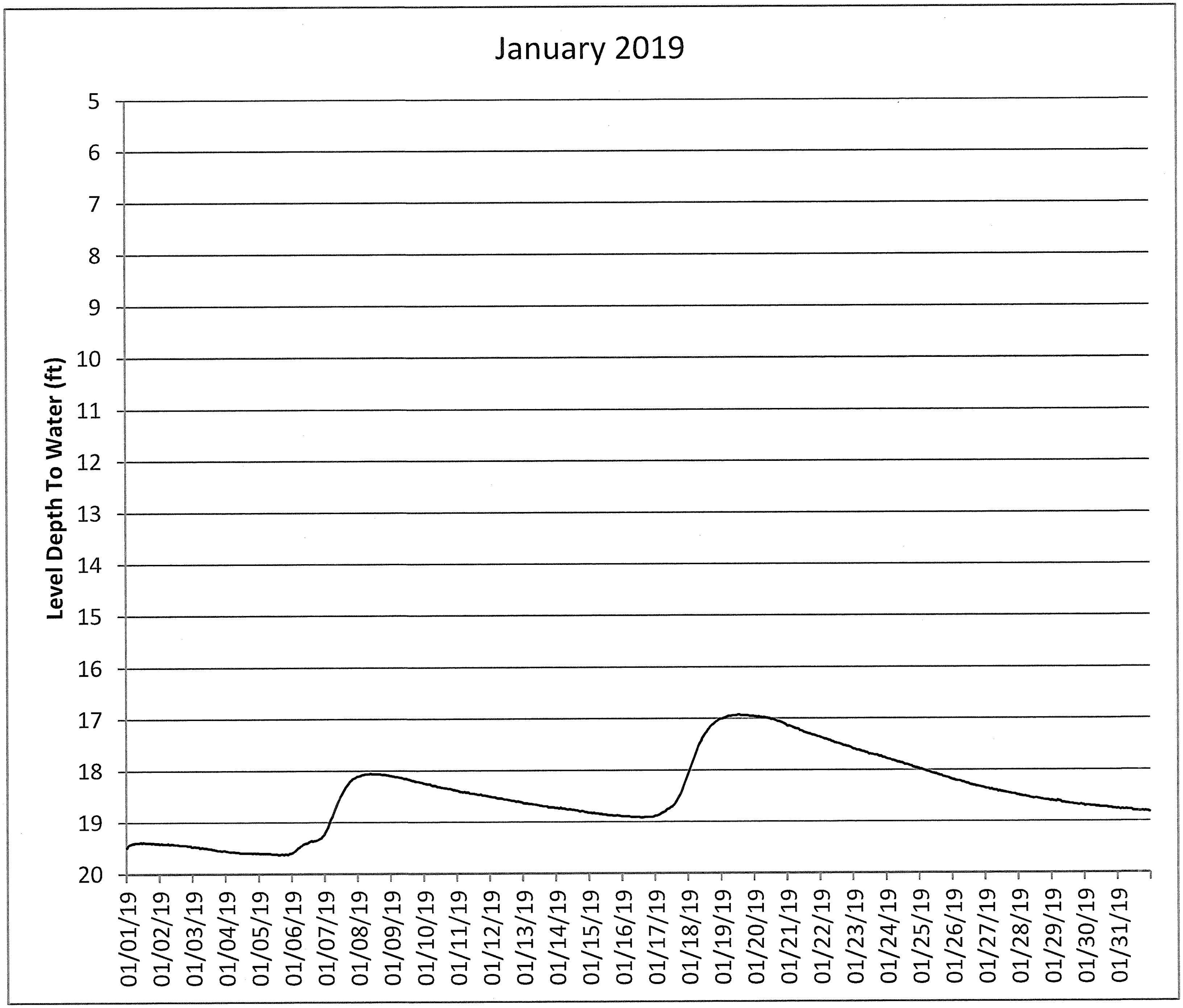

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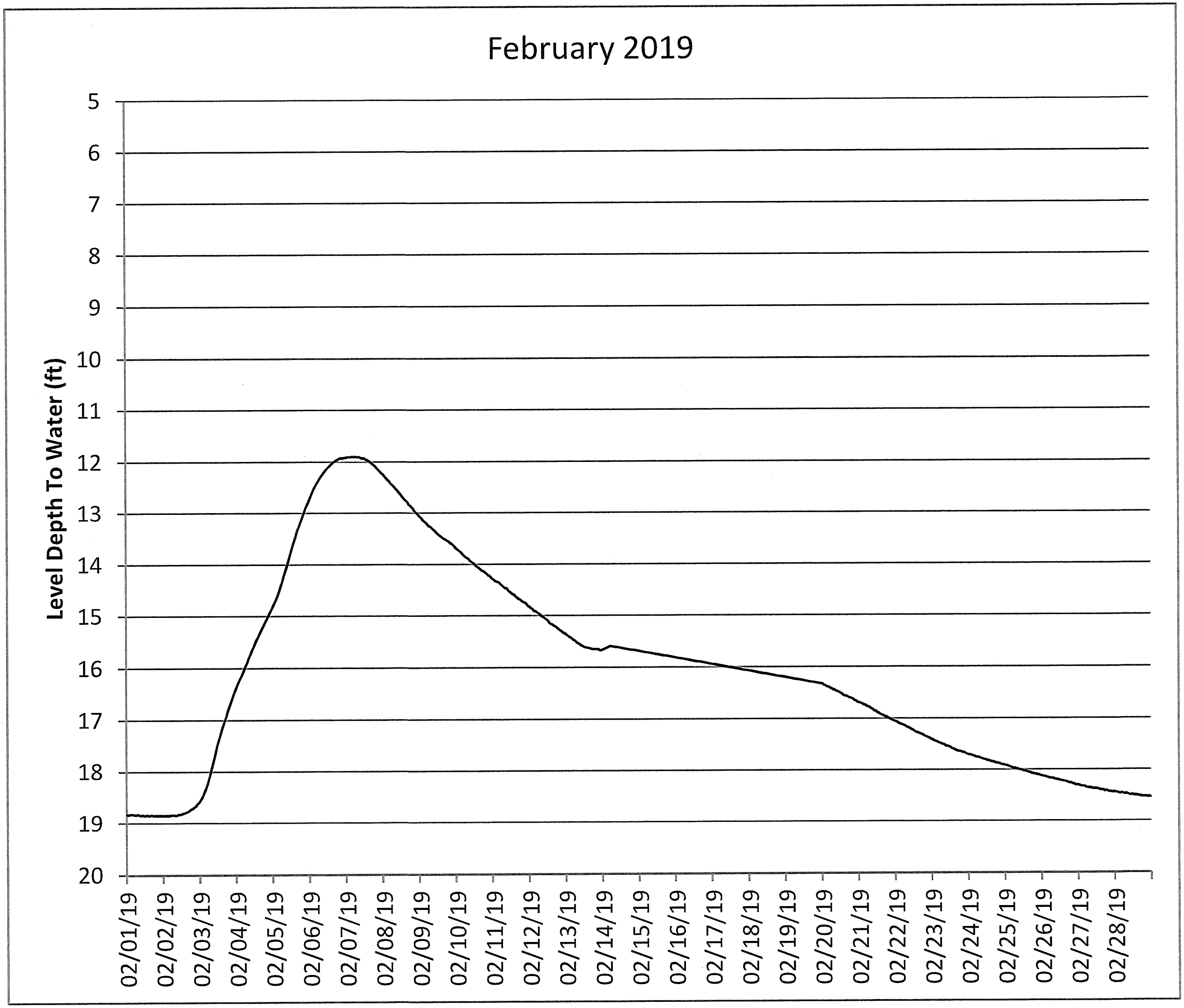

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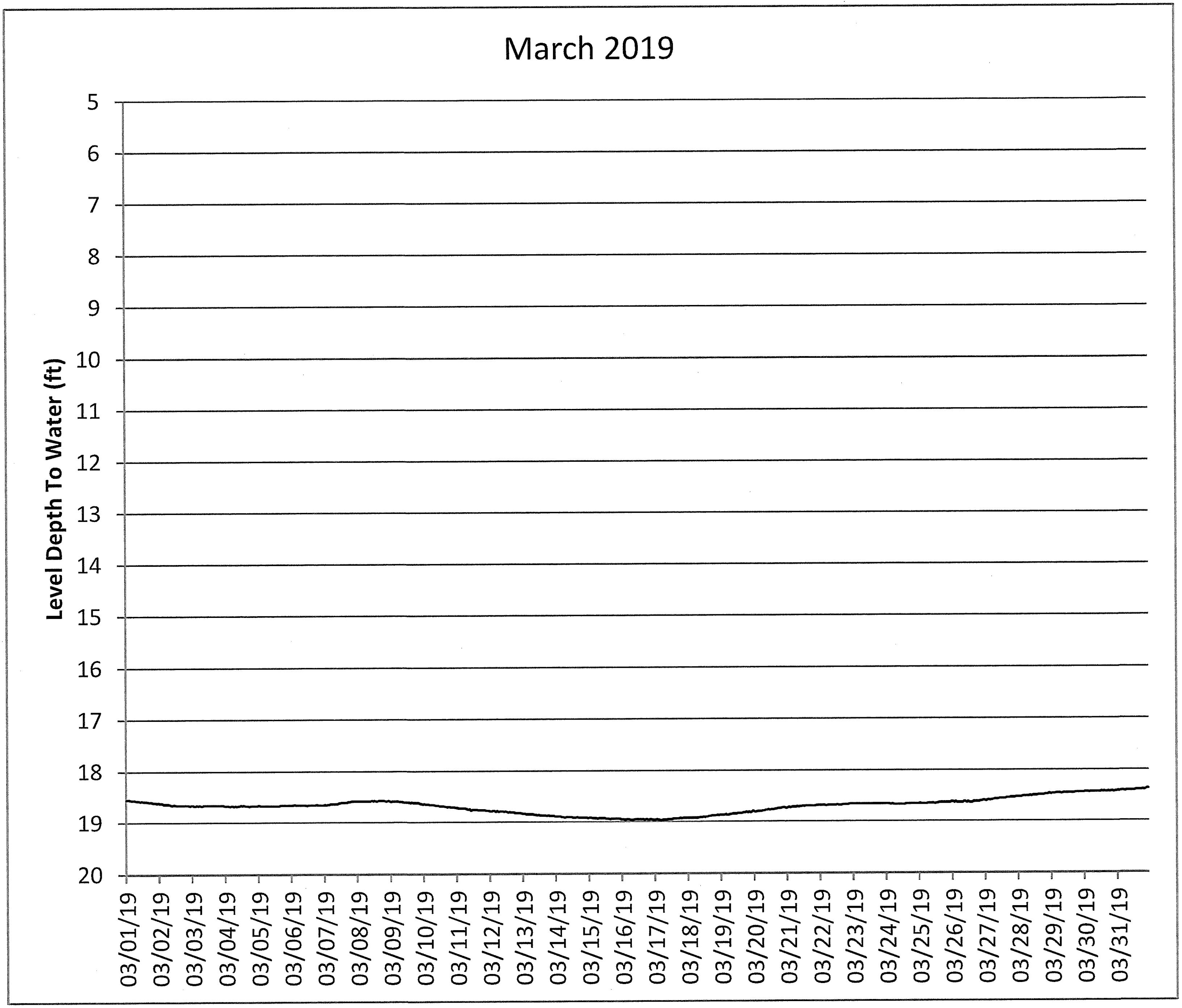

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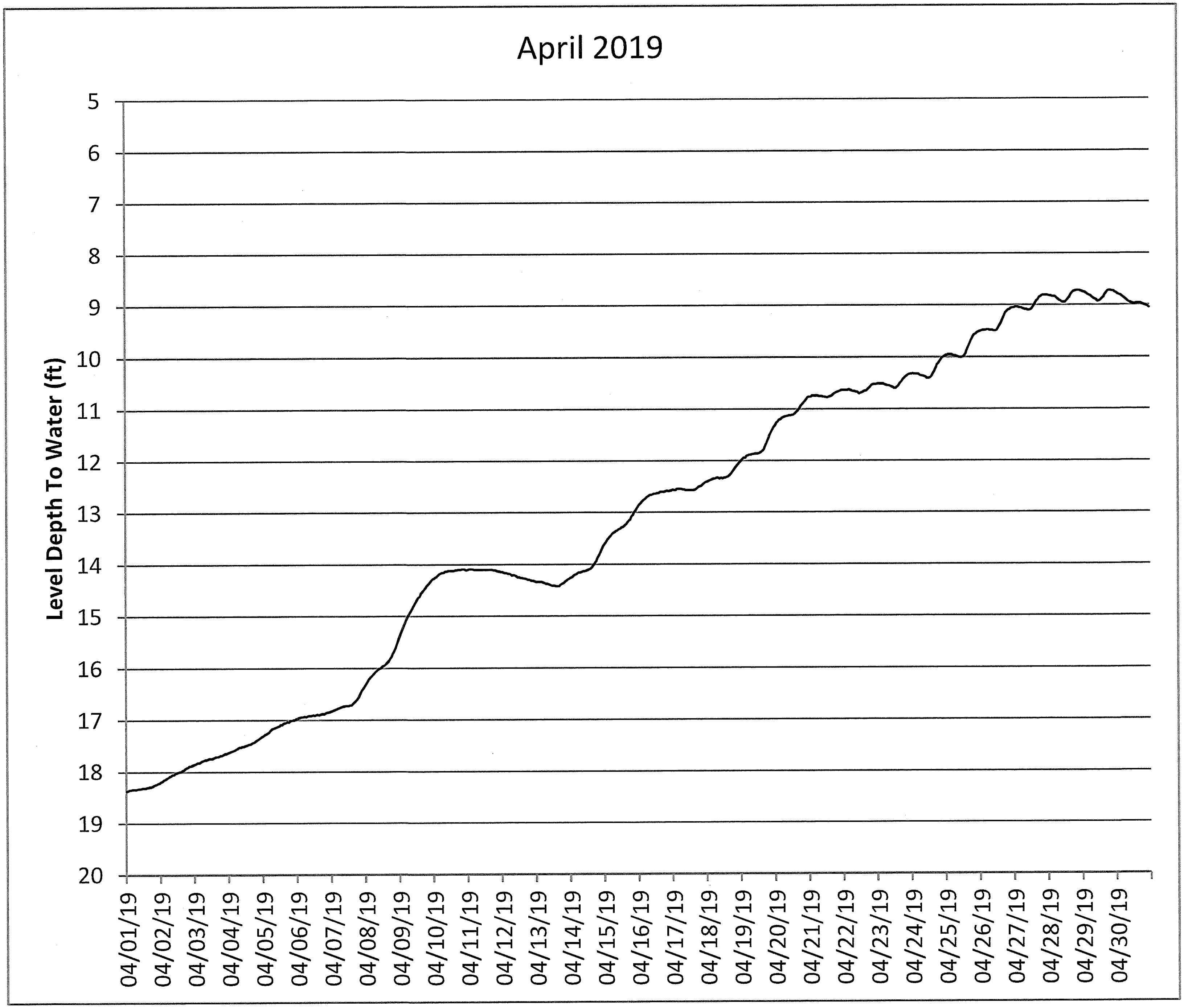

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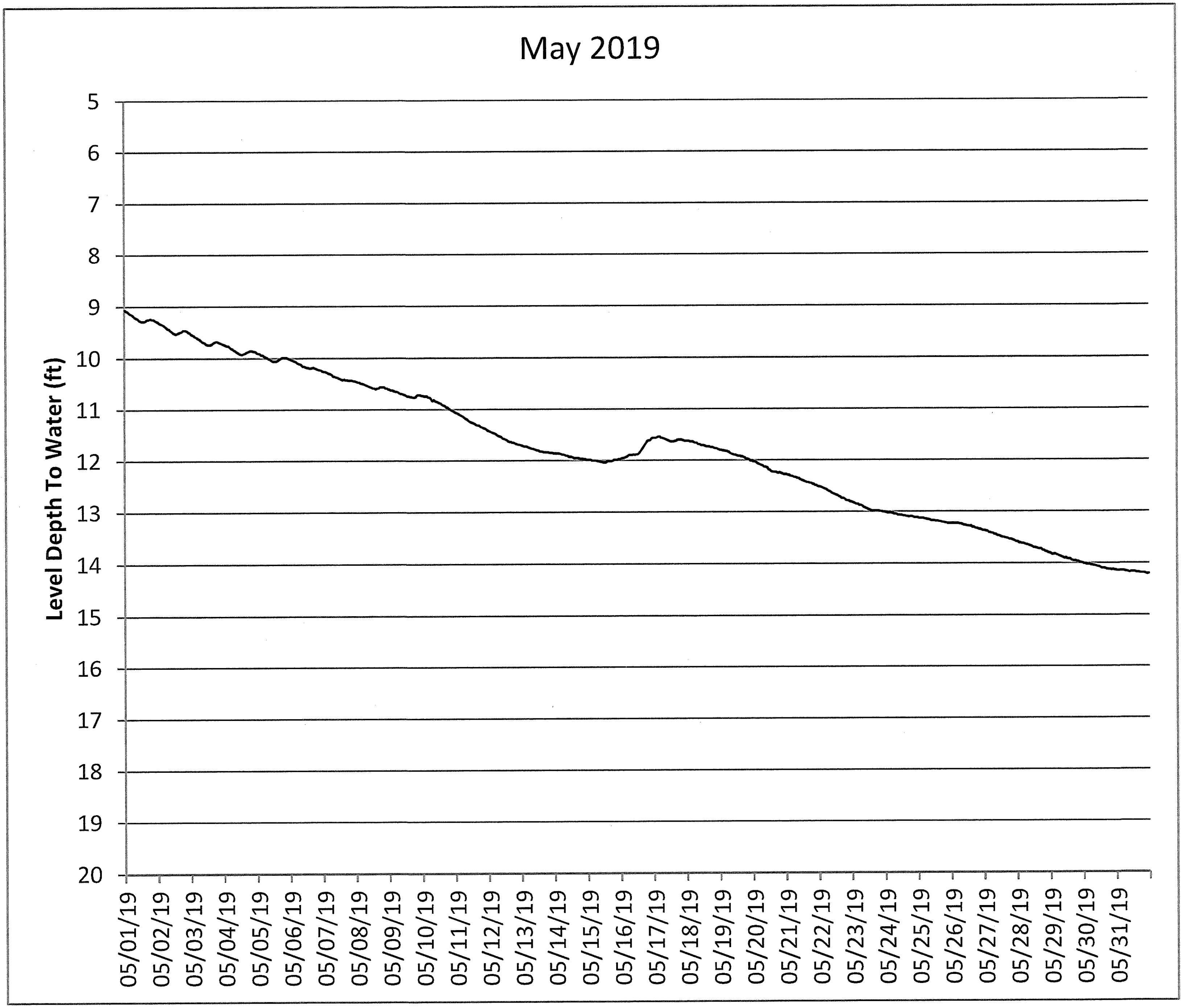

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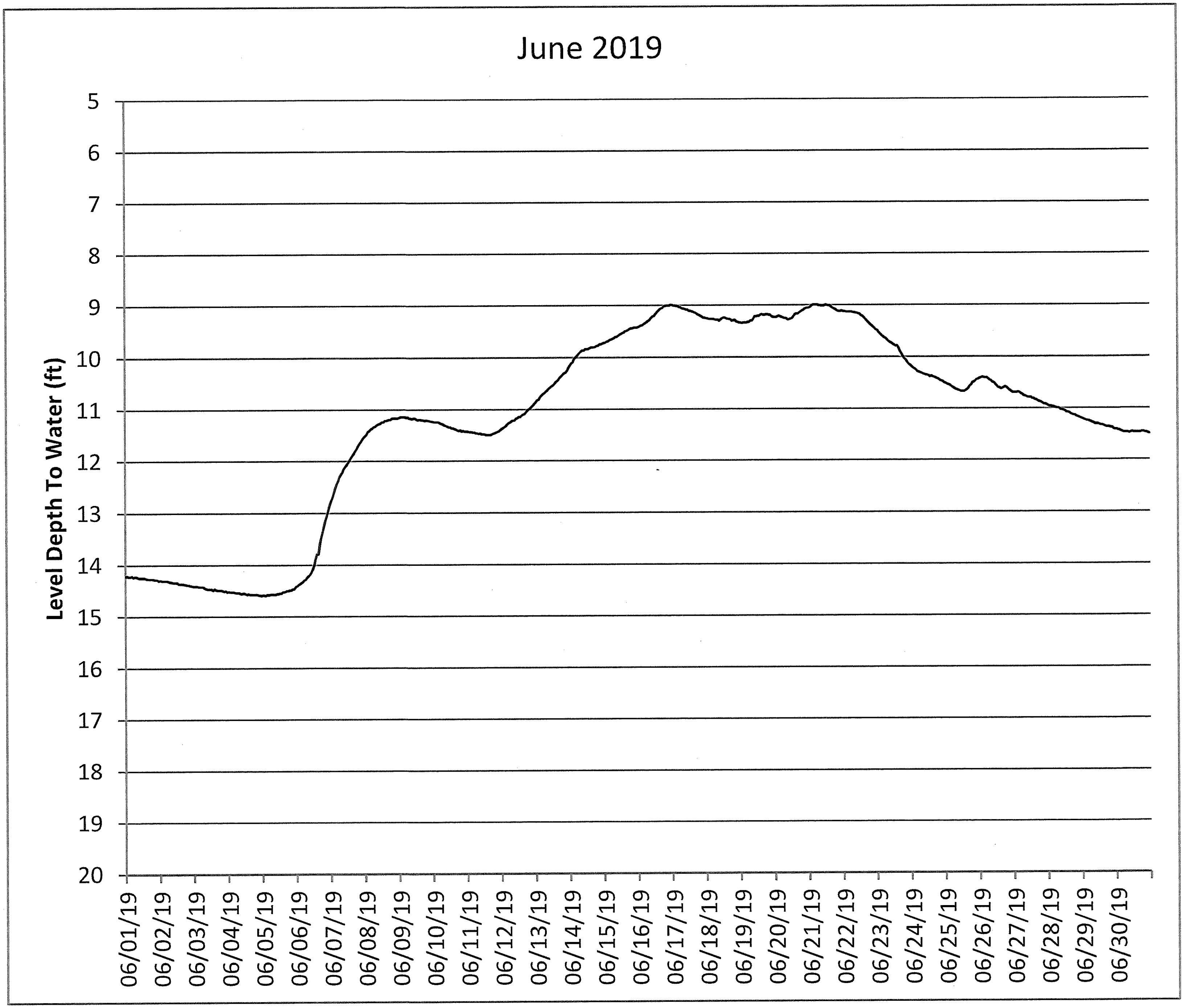

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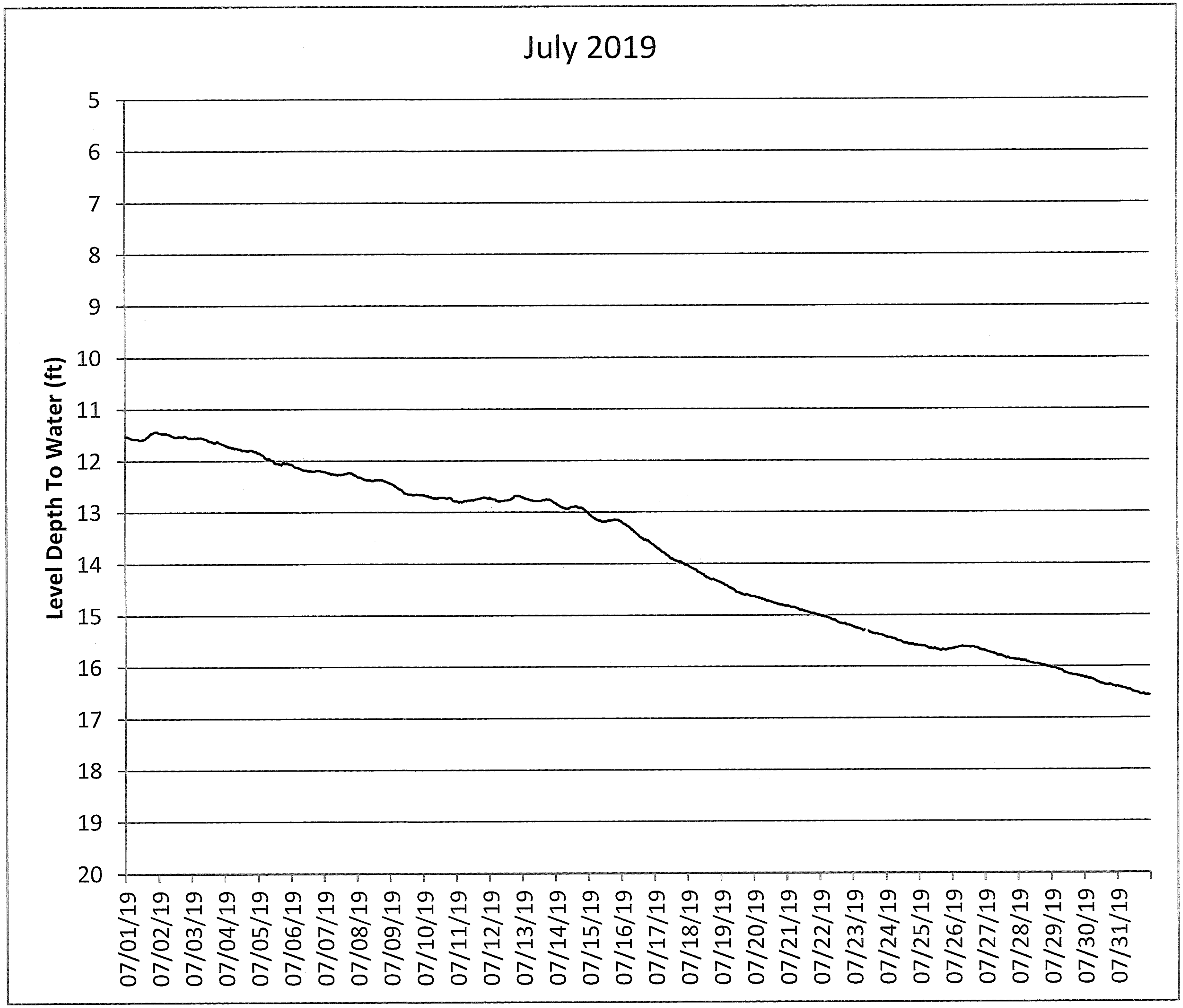

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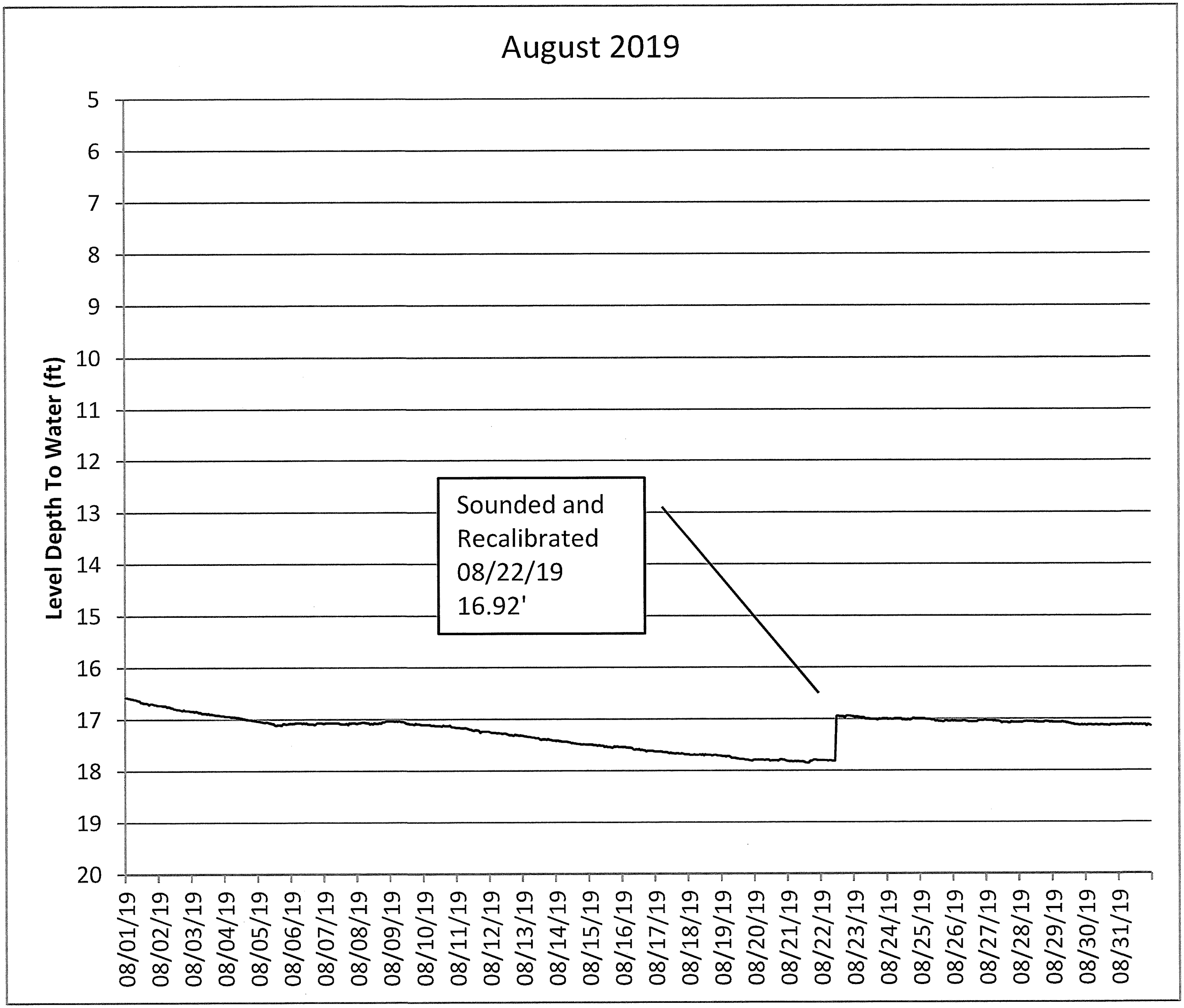

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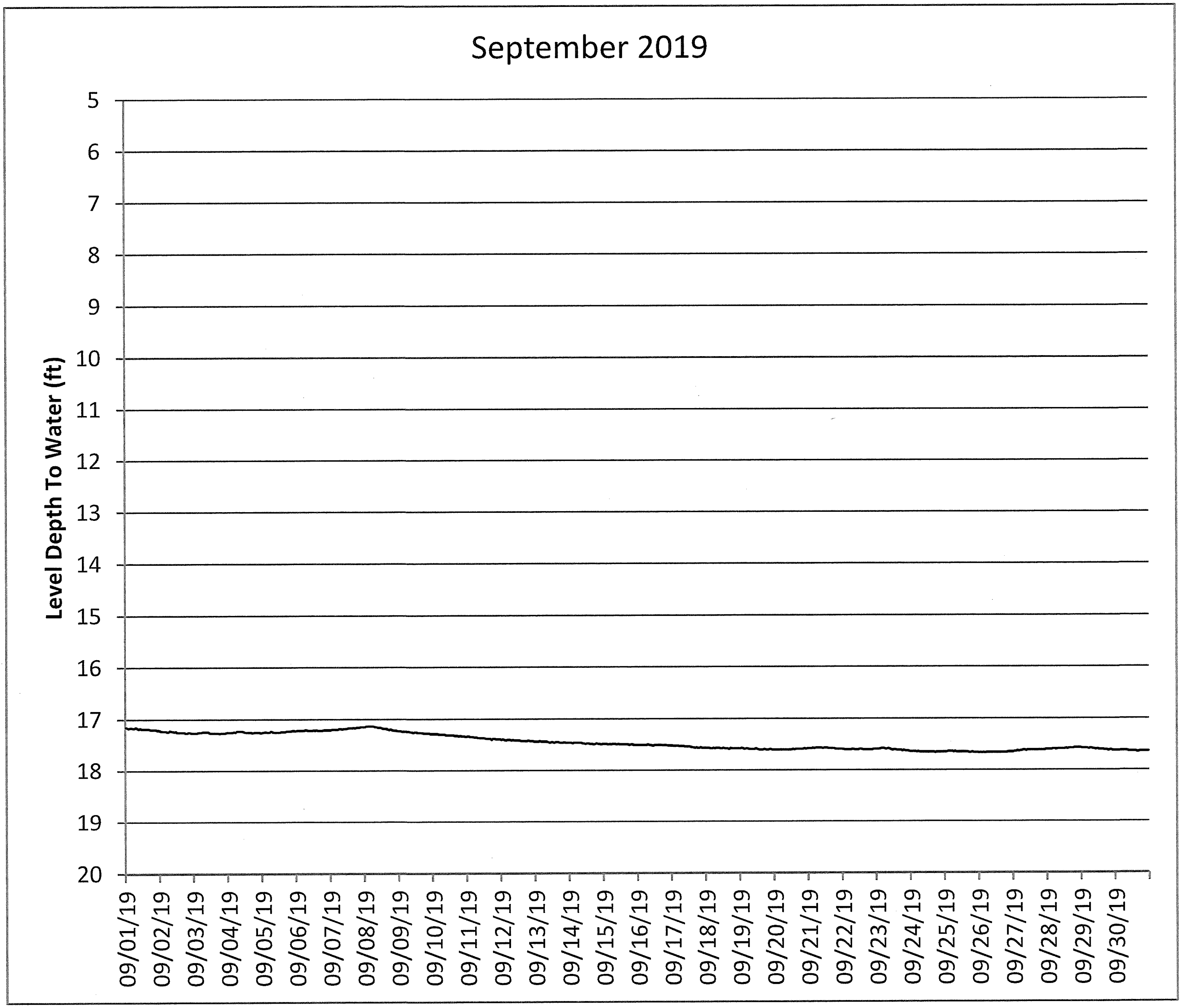

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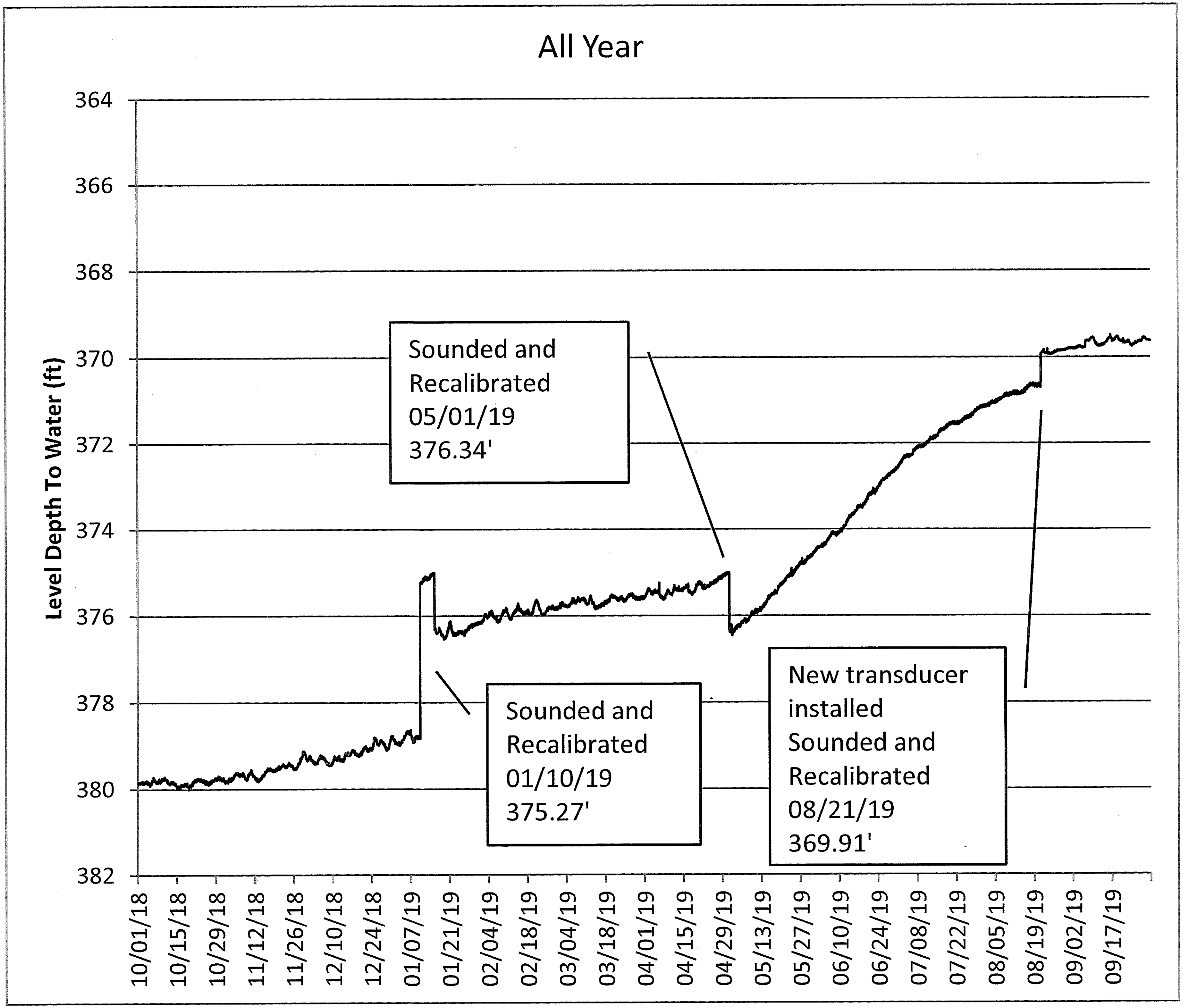
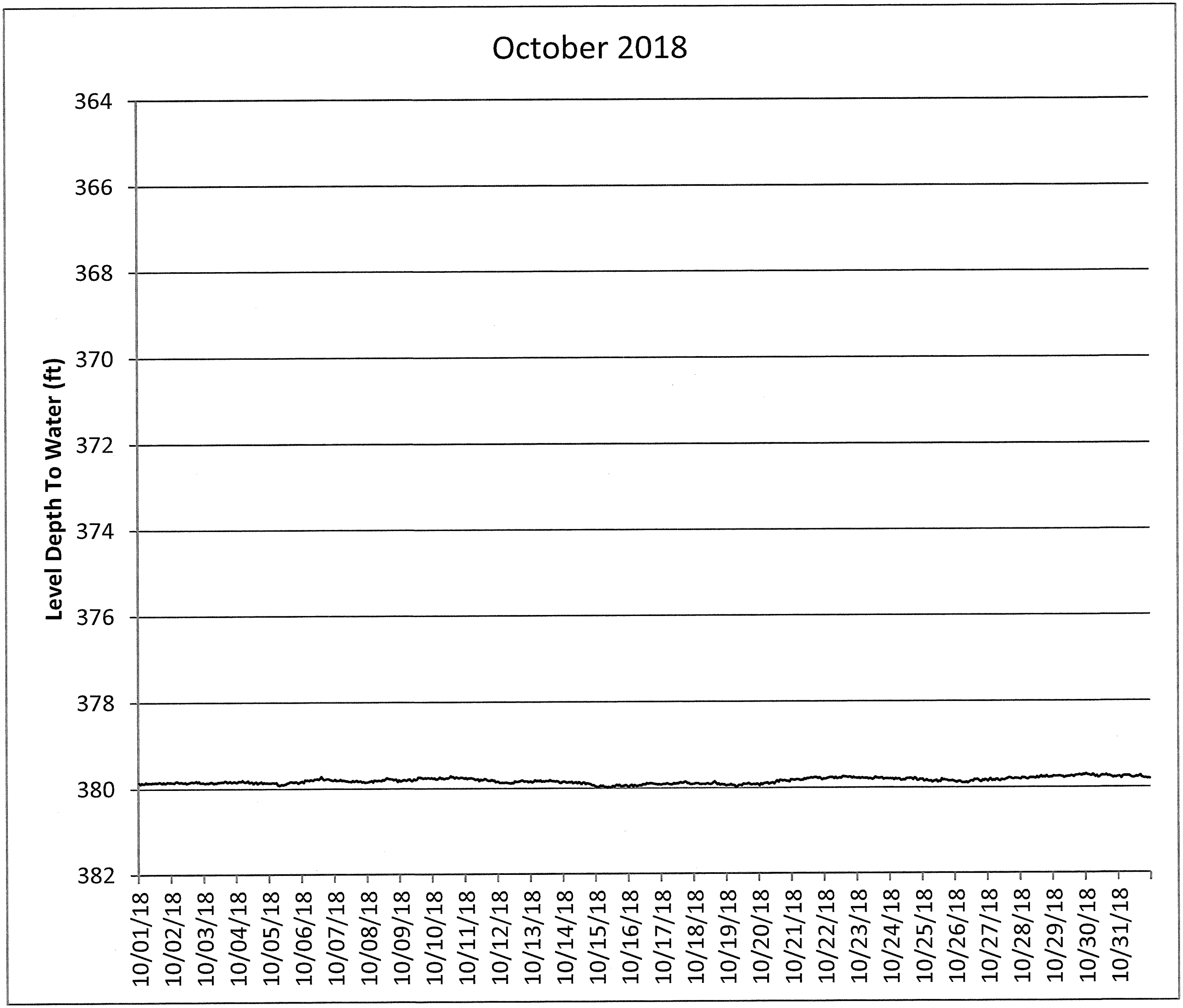


WATER LEVEL HYDROGRAPH FOR MW-24M



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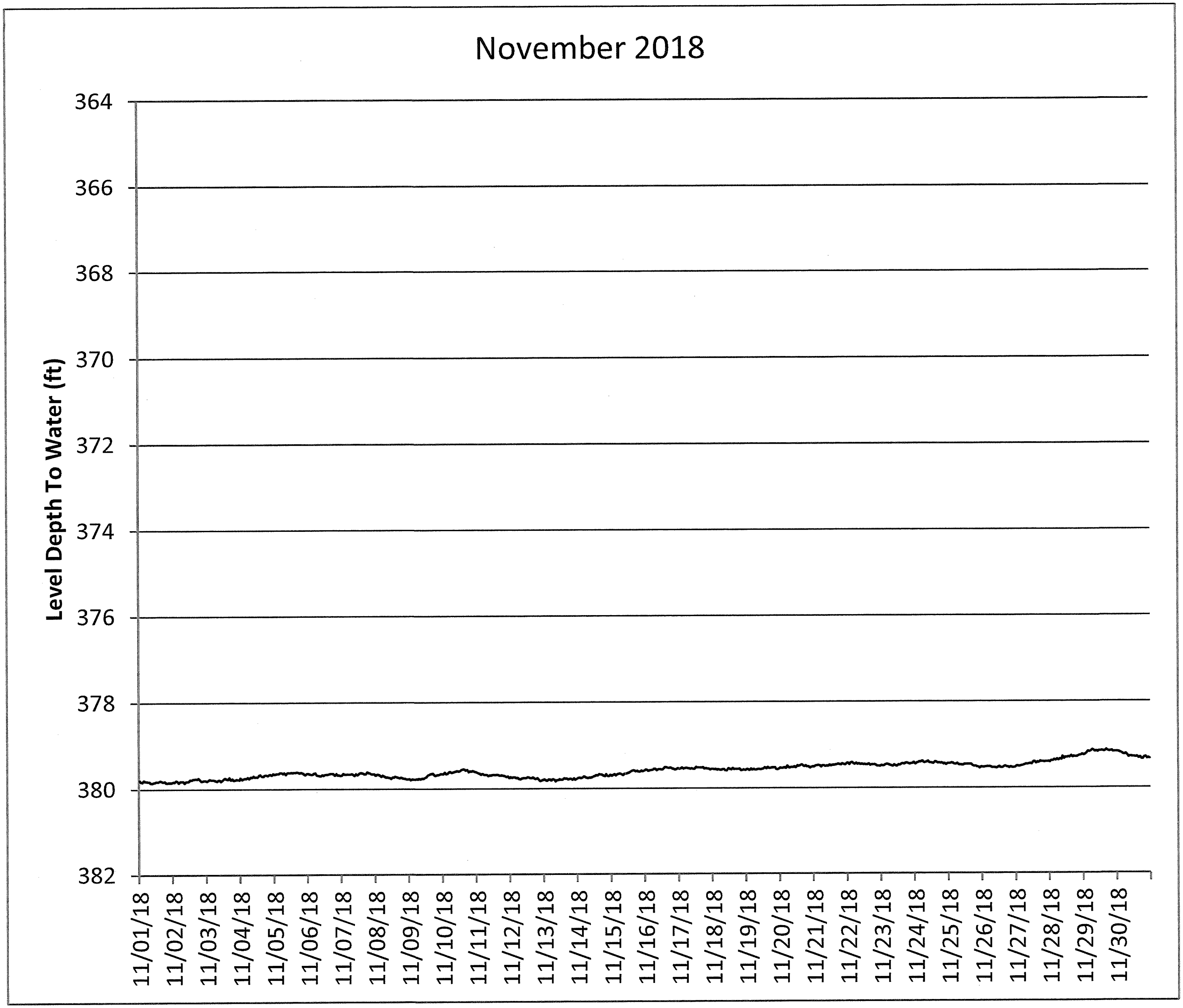

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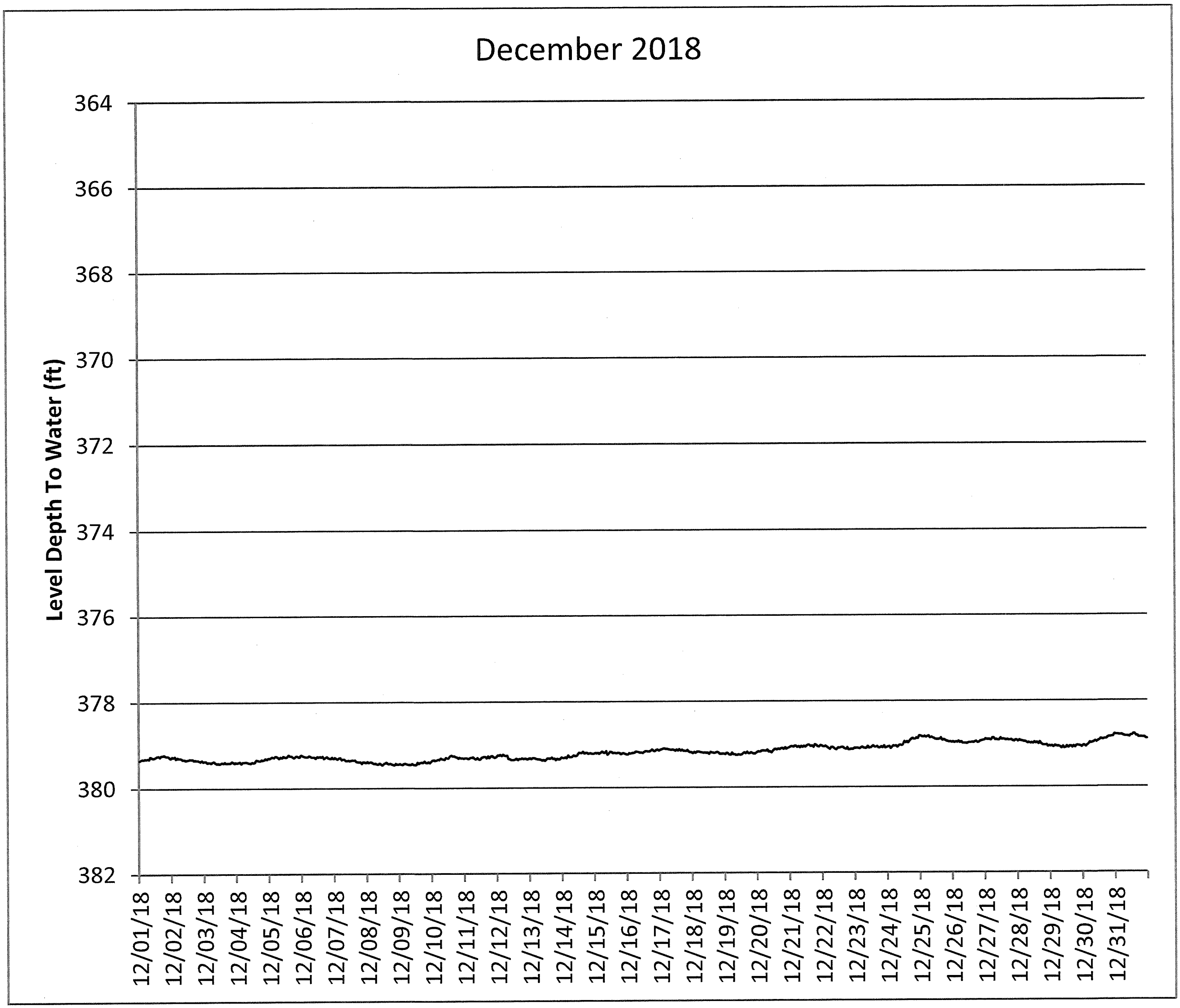

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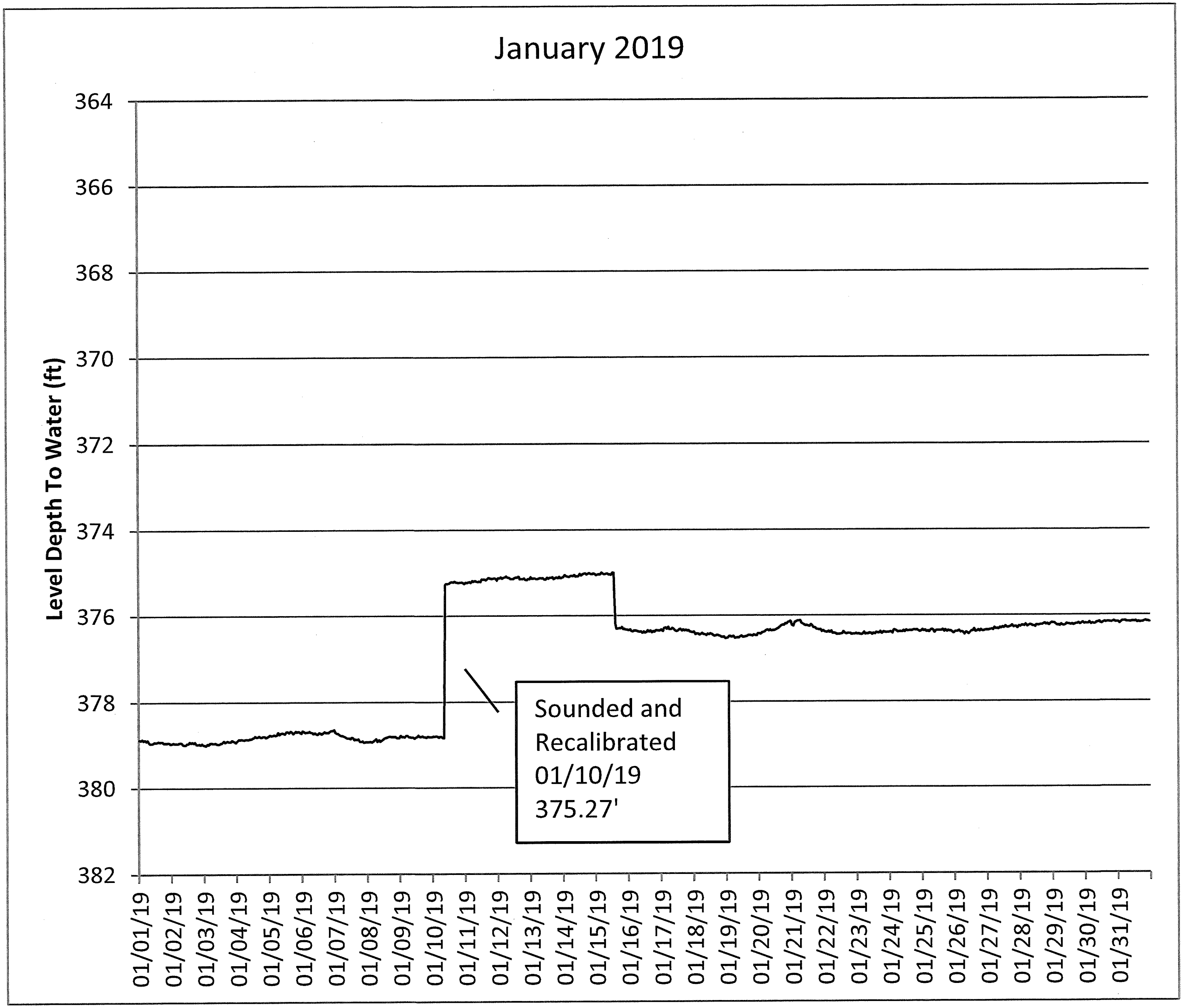

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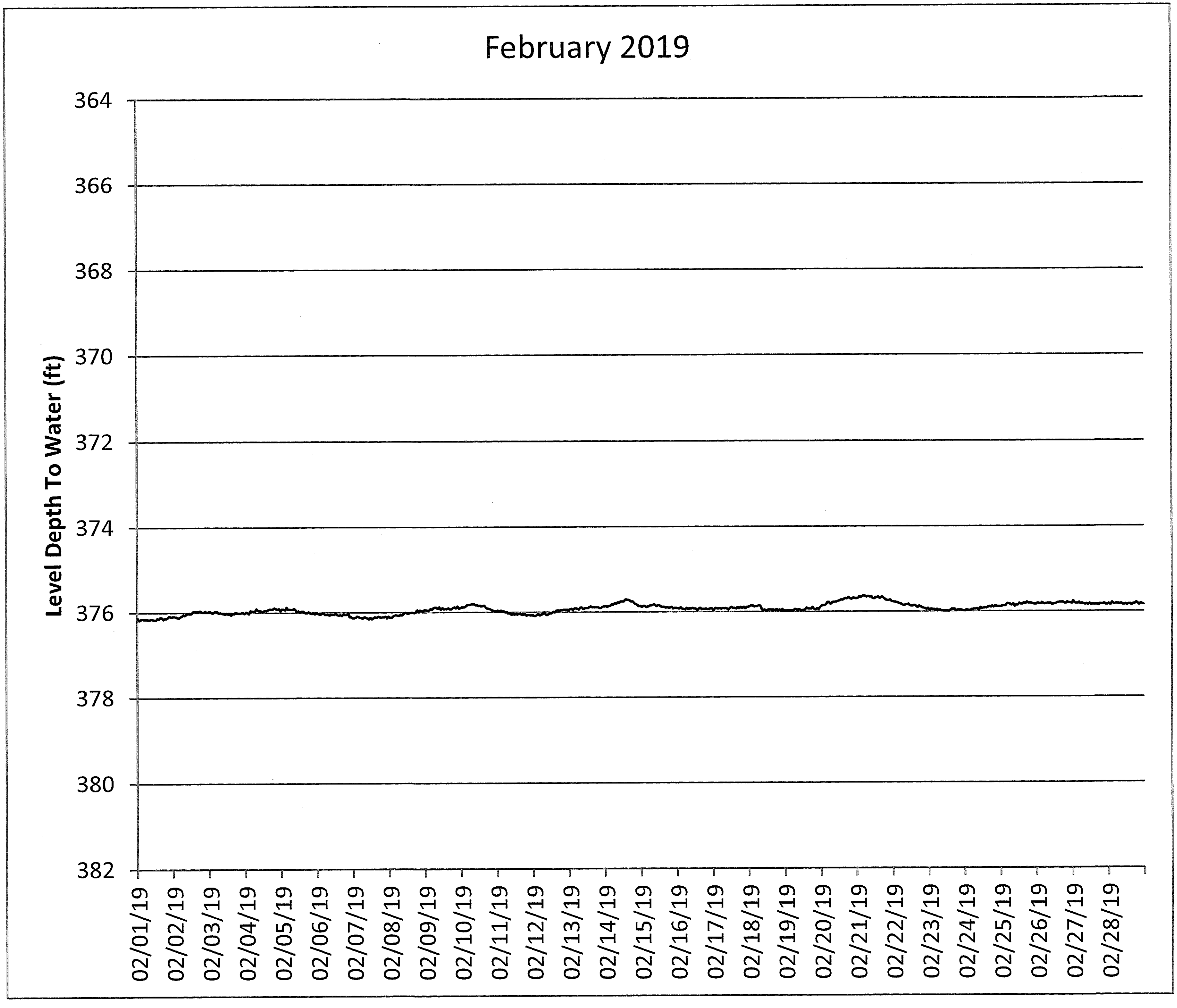

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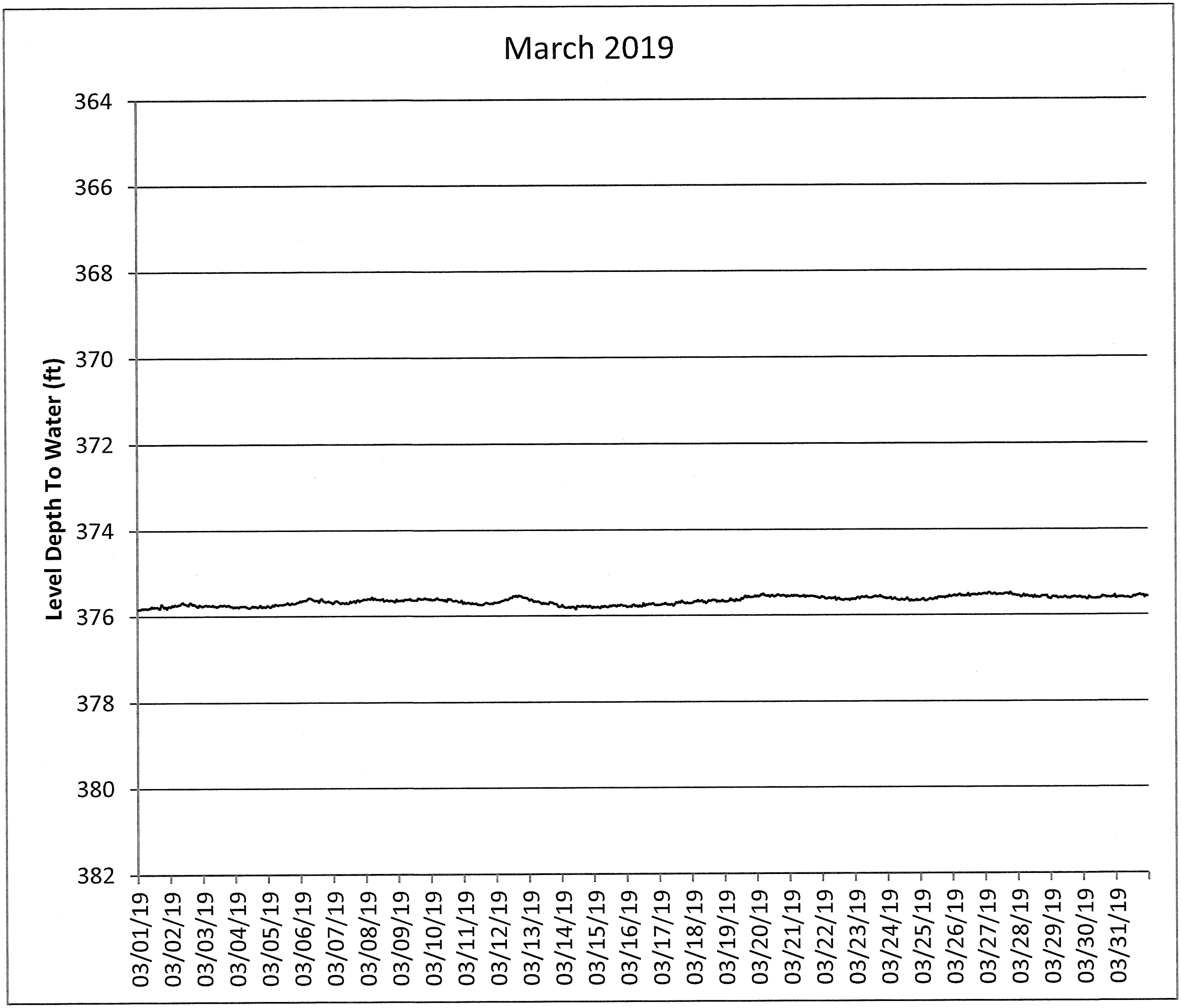

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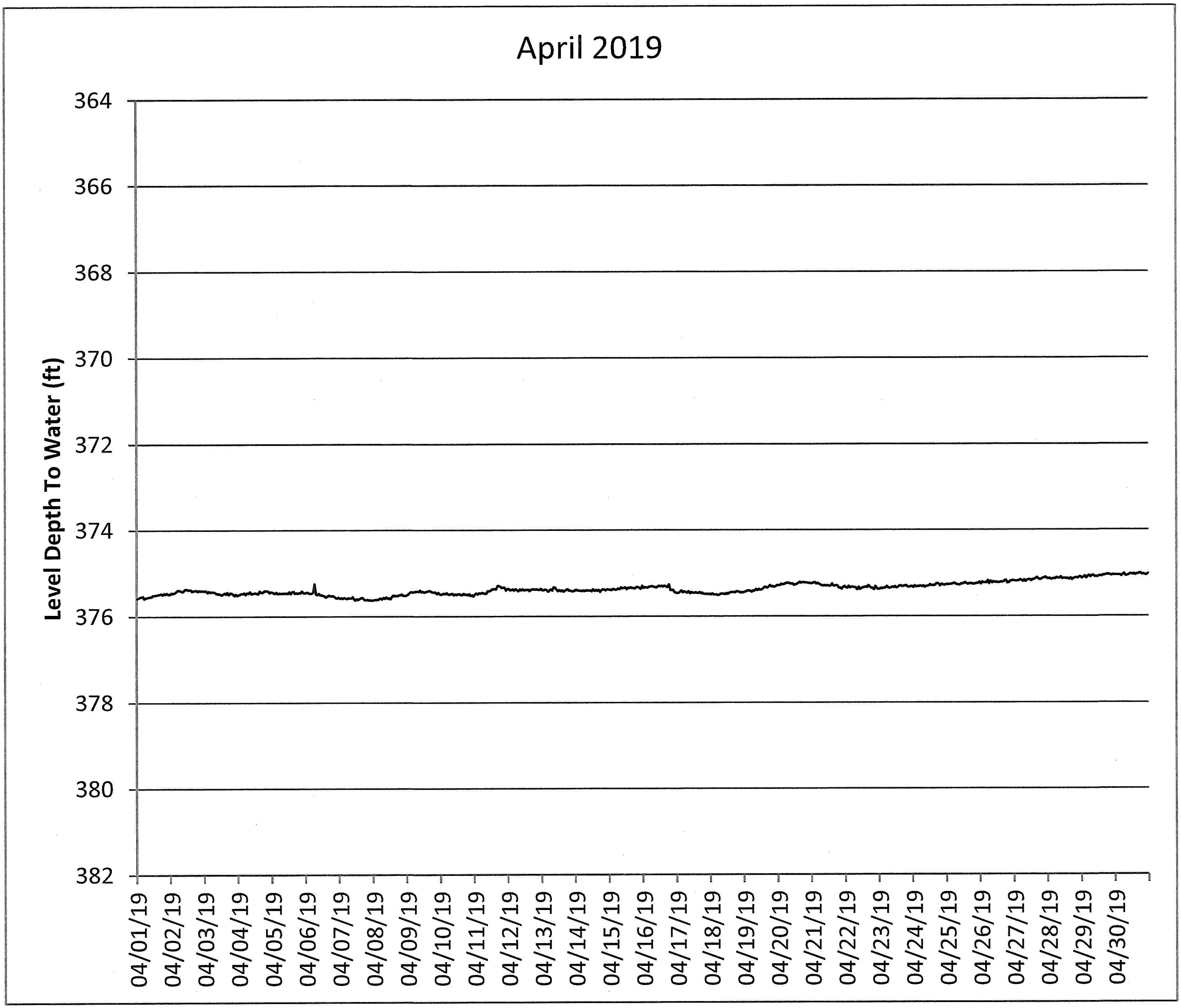

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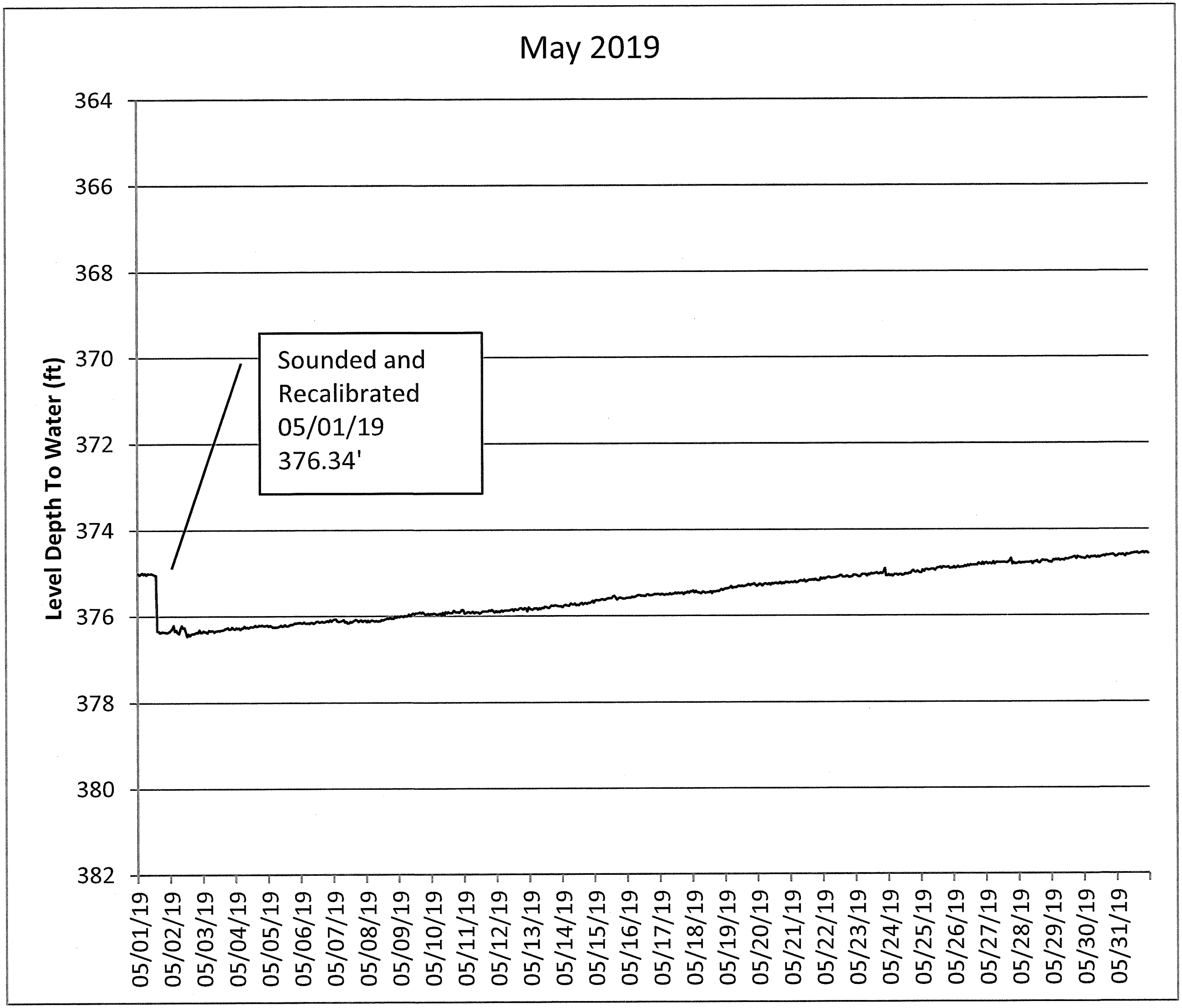

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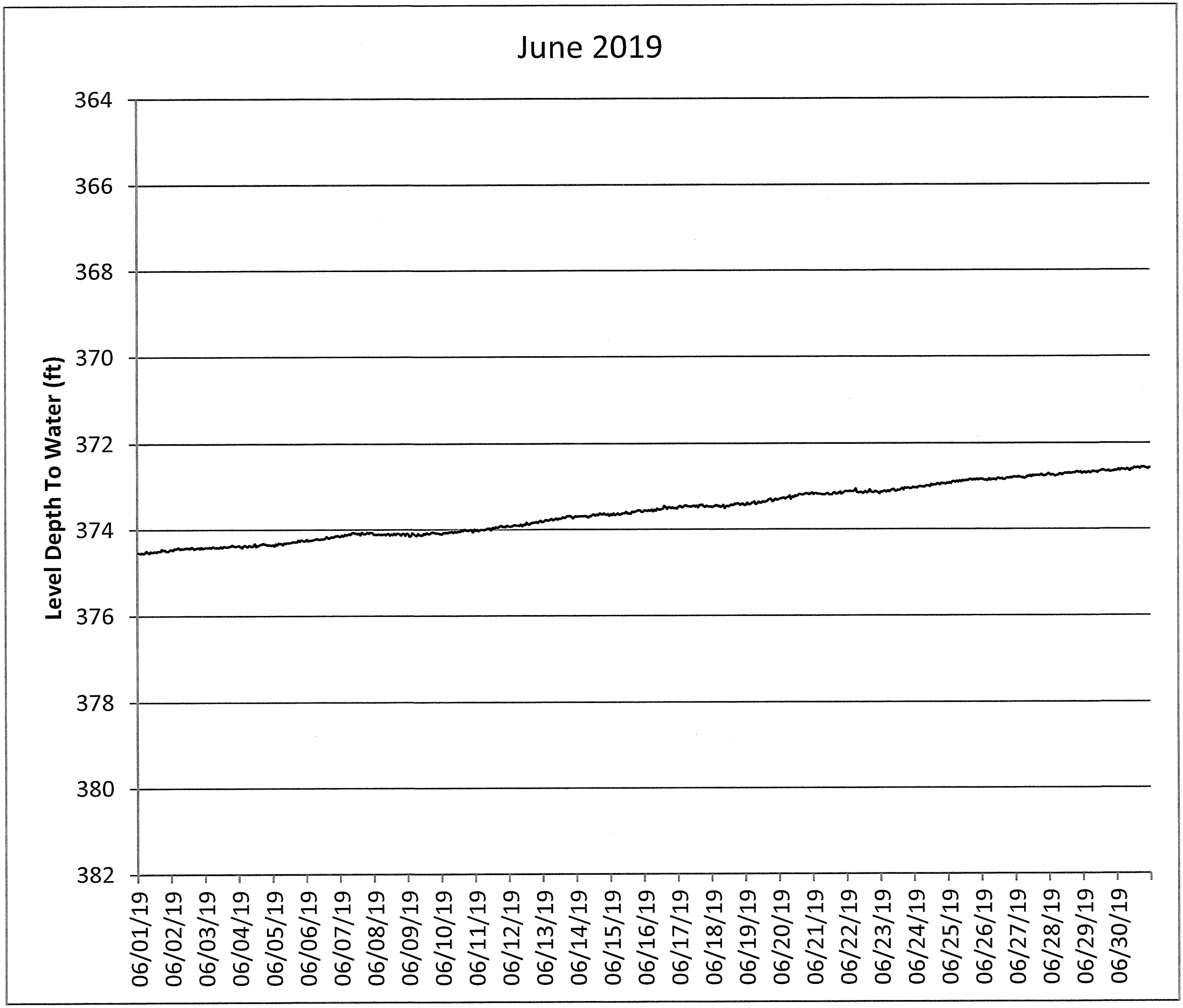

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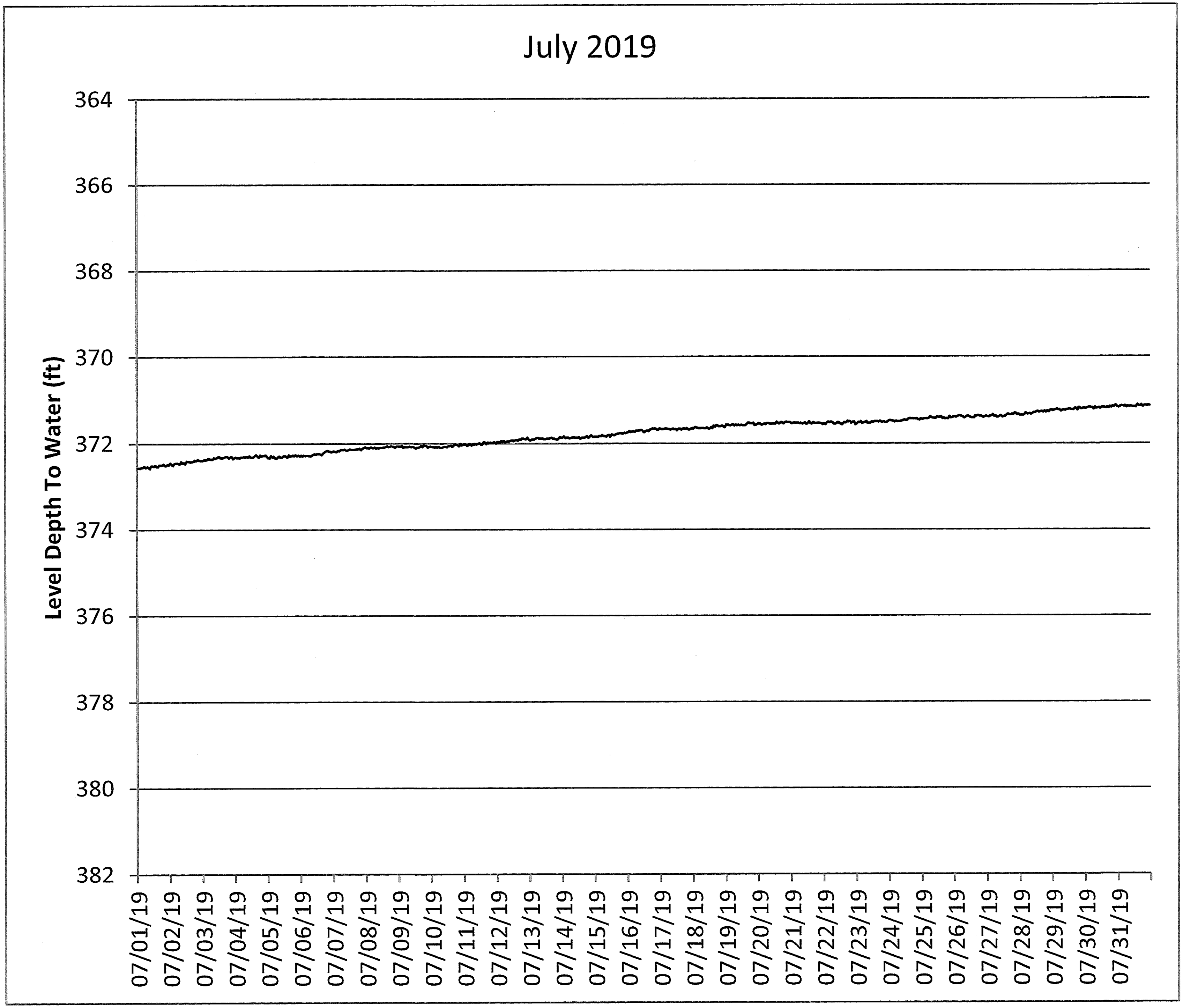

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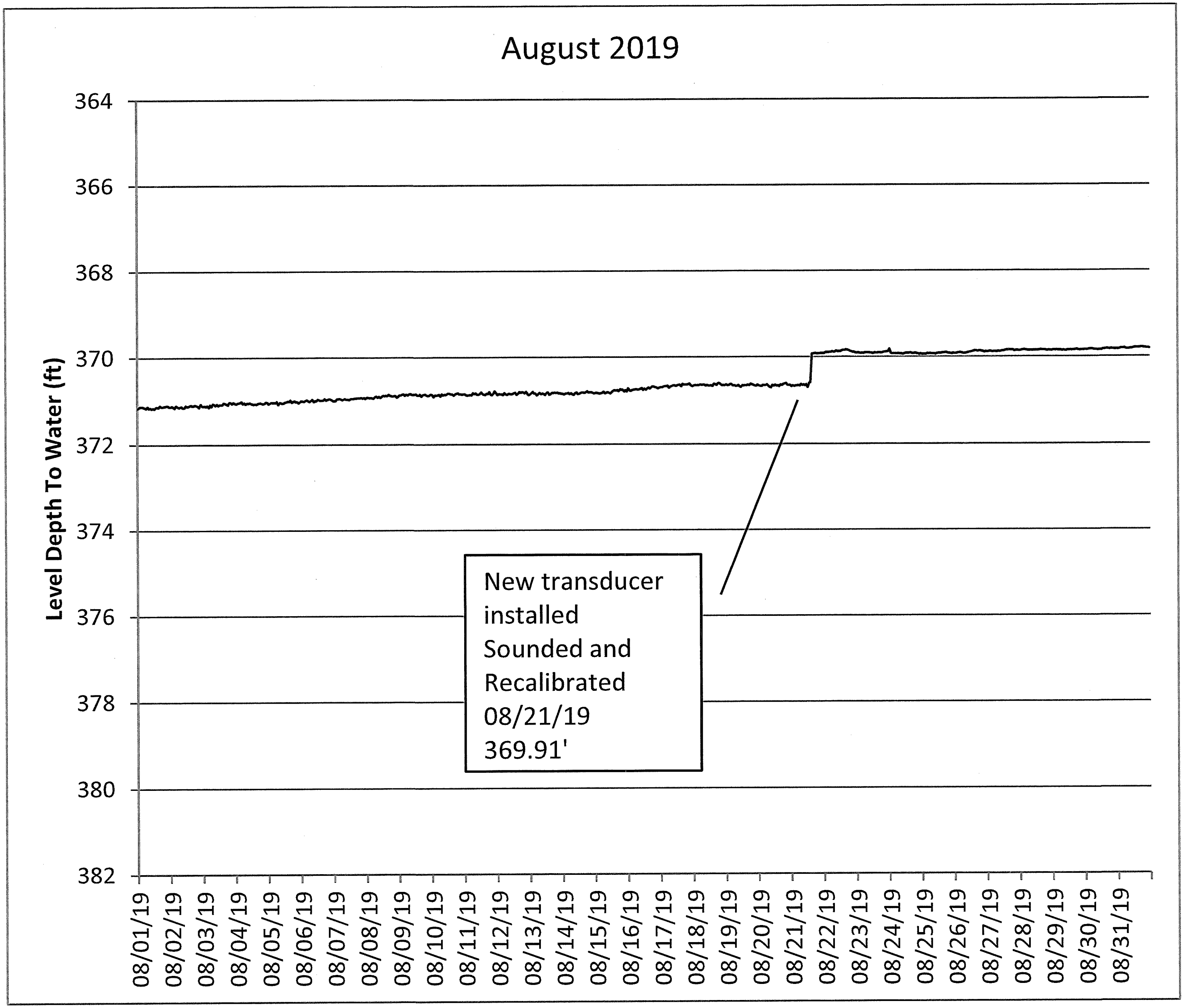
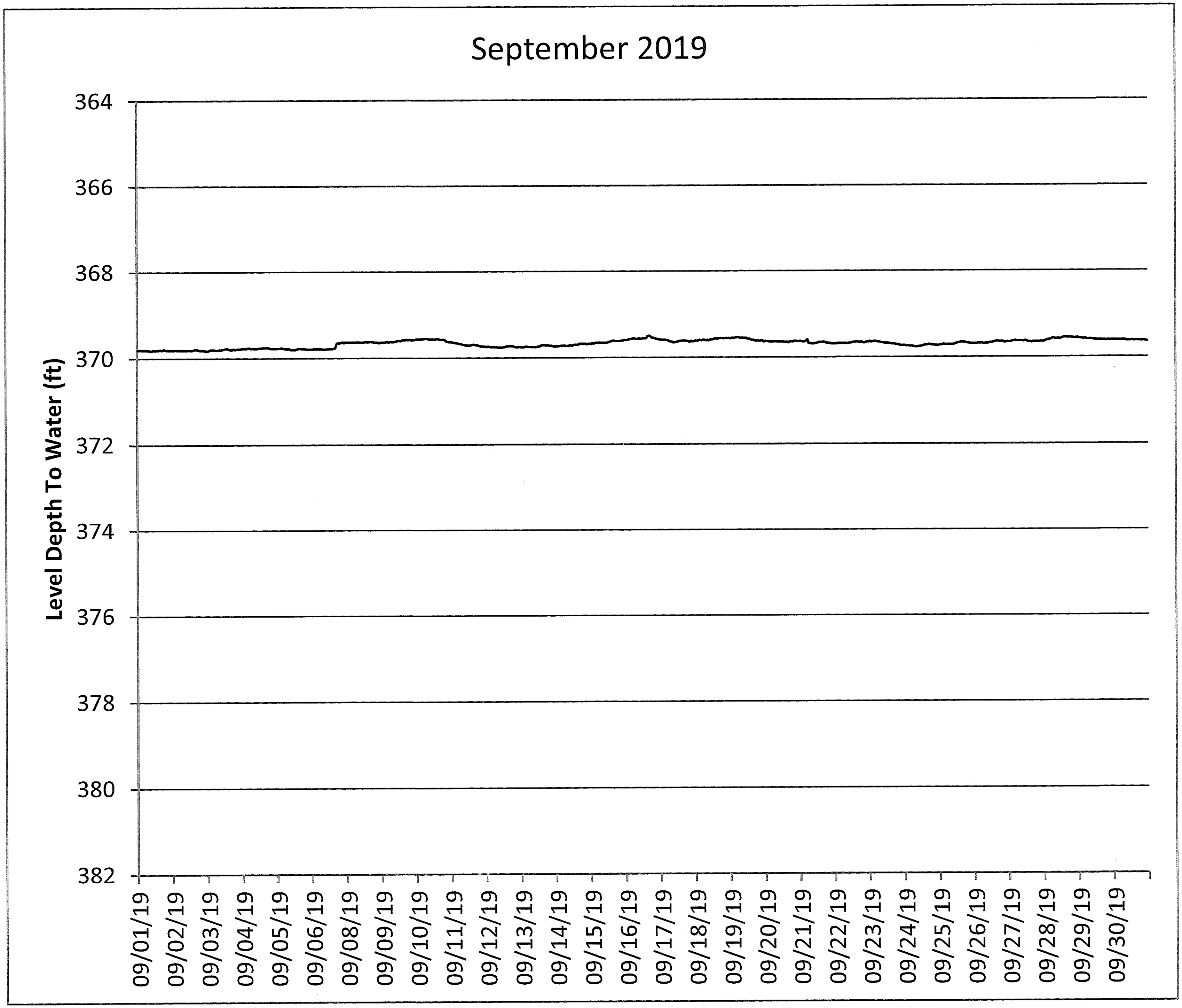
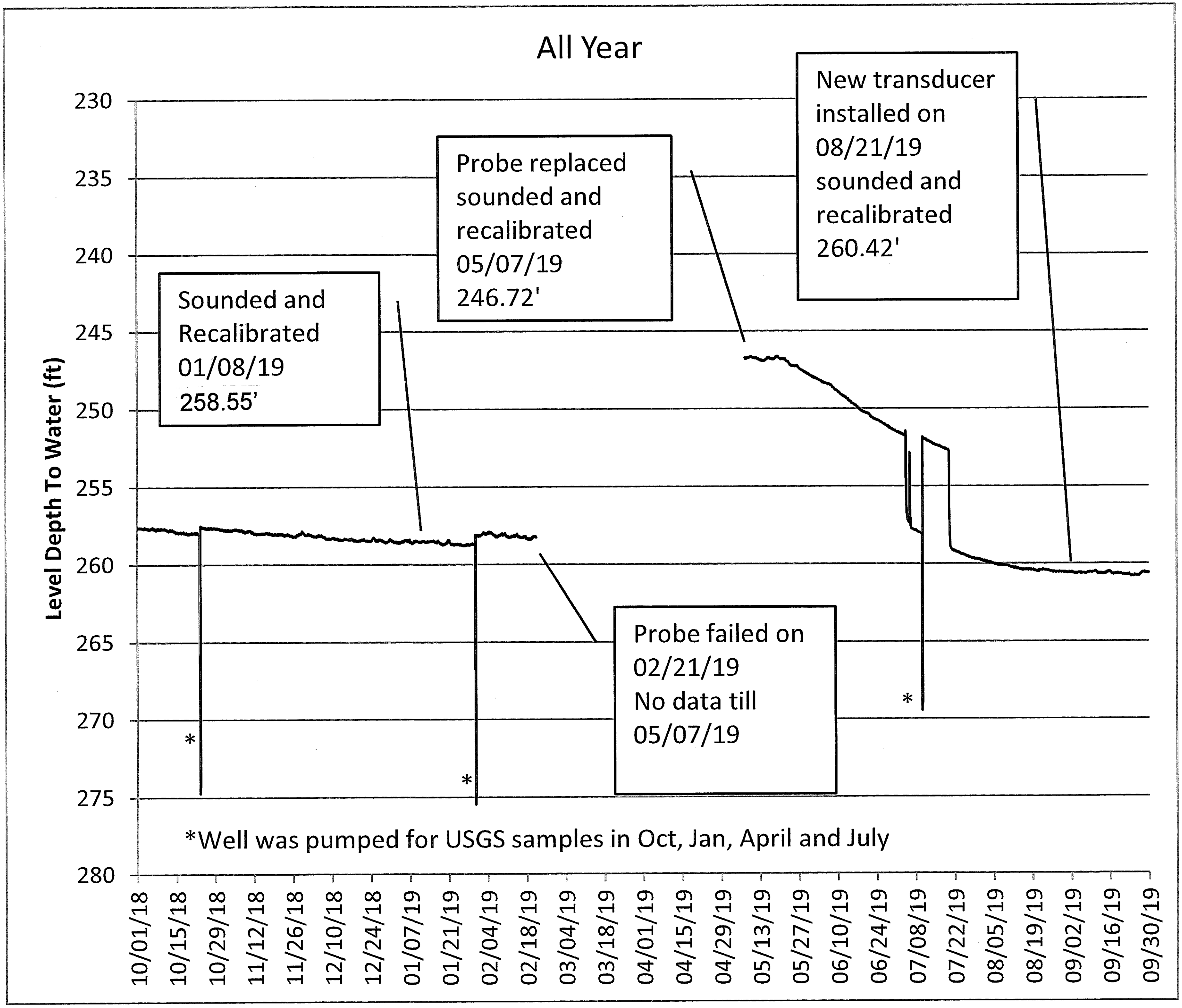


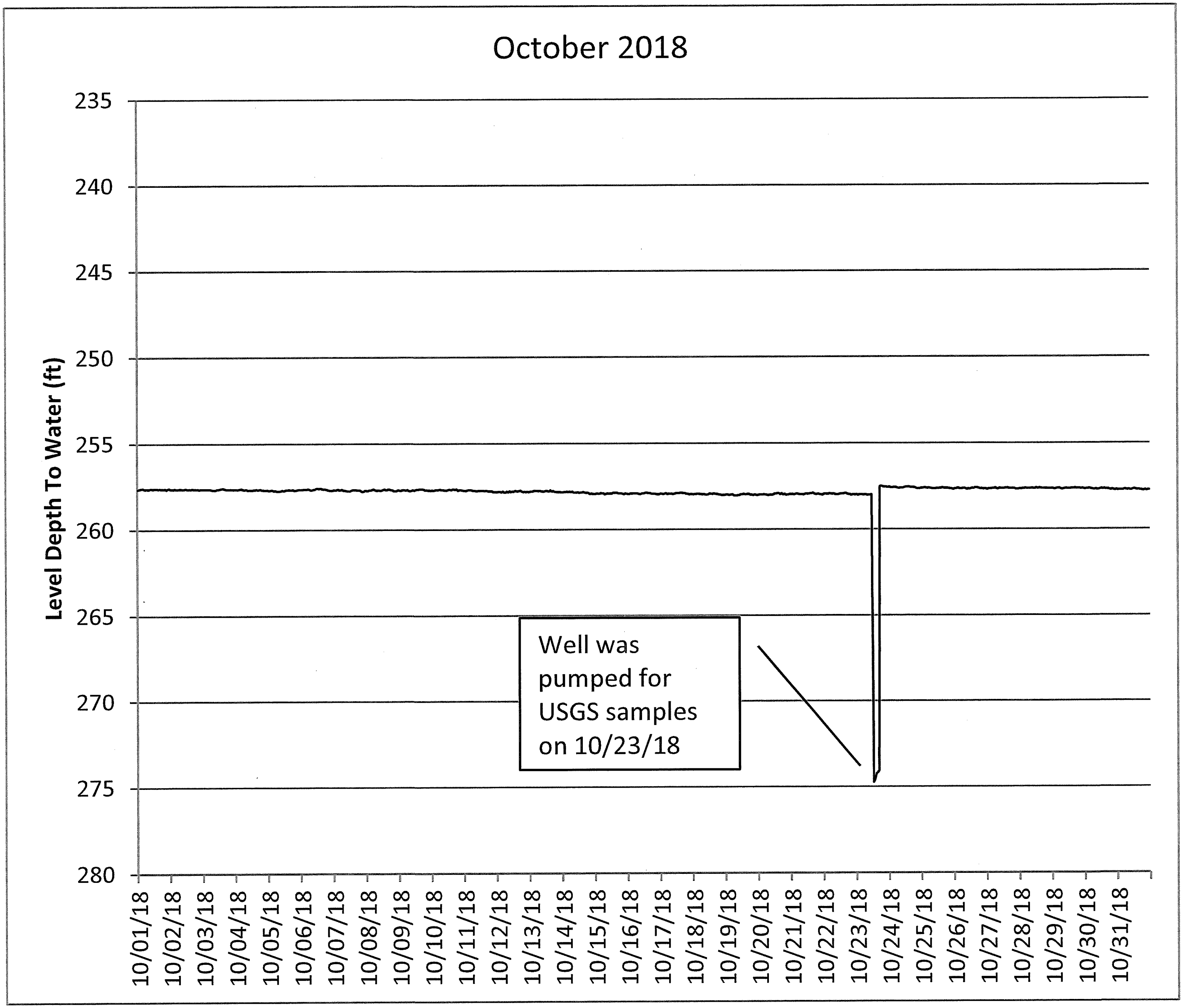
WATER LEVEL HYDROGRAPH FOR MW-24M



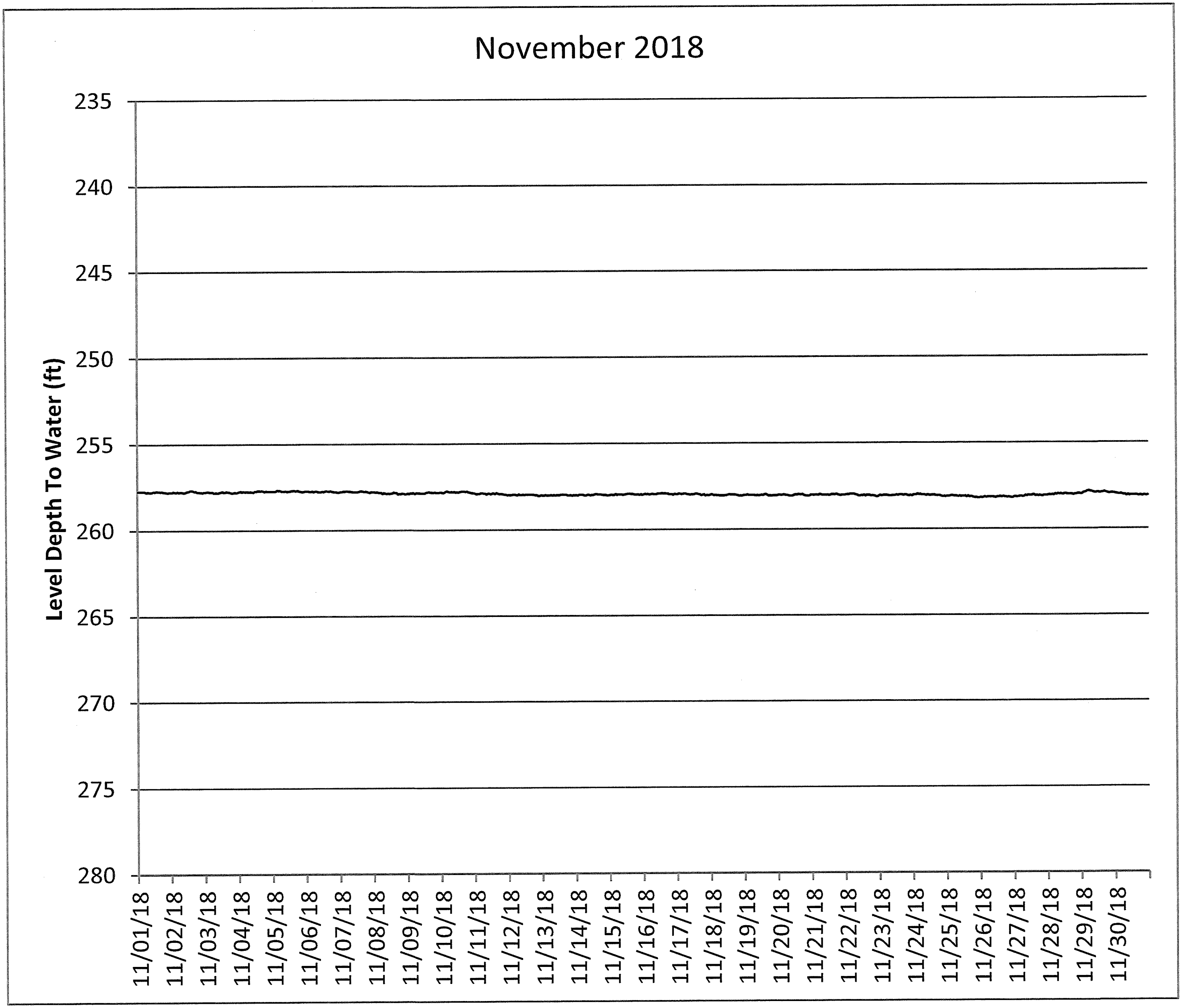
WATER LEVEL HYDROGRAPH FOR MW-24M



WATER LEVEL HYDROGRAPH FOR MW-26M



WATER LEVEL HYDROGRAPH FOR MW-26M



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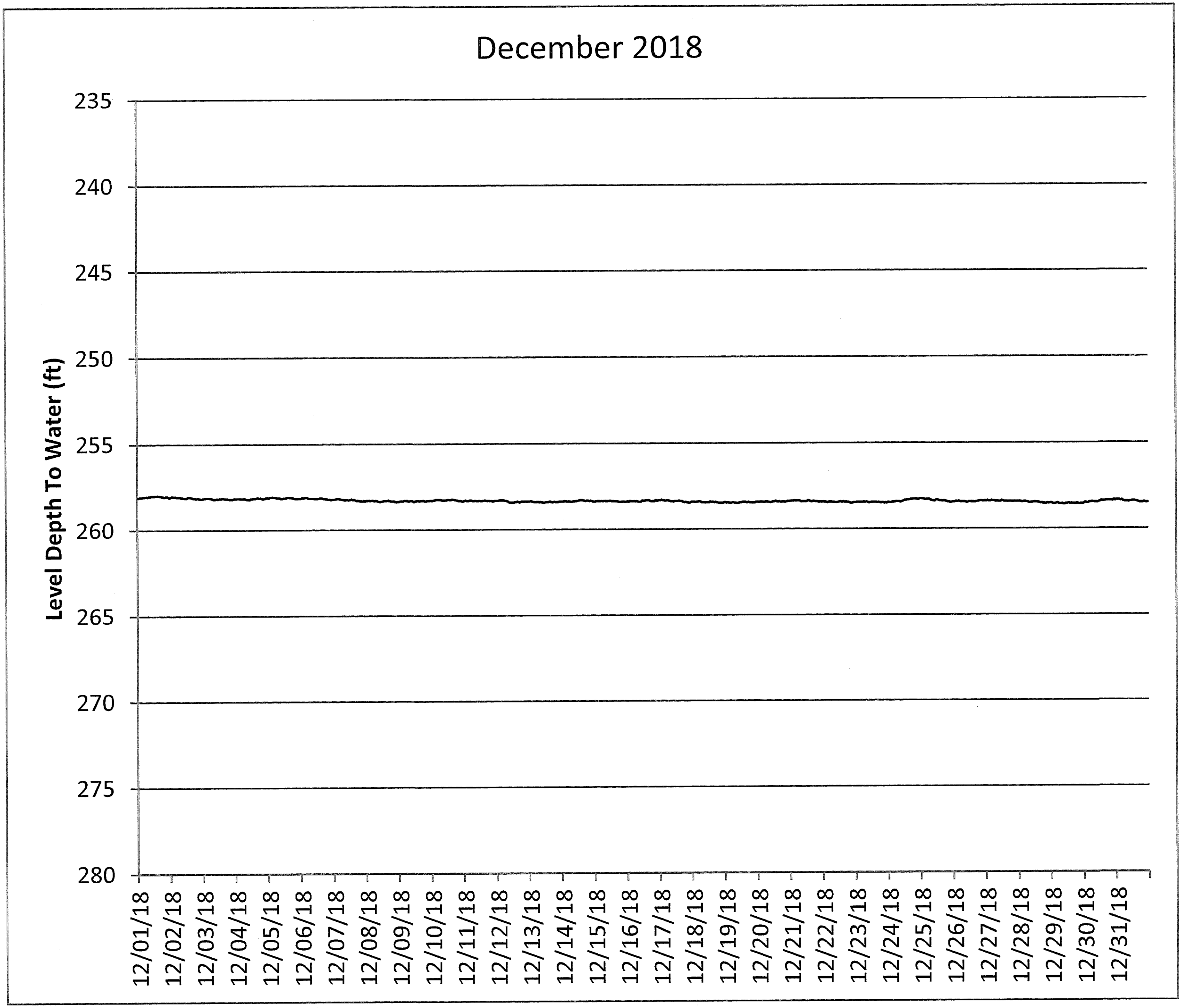

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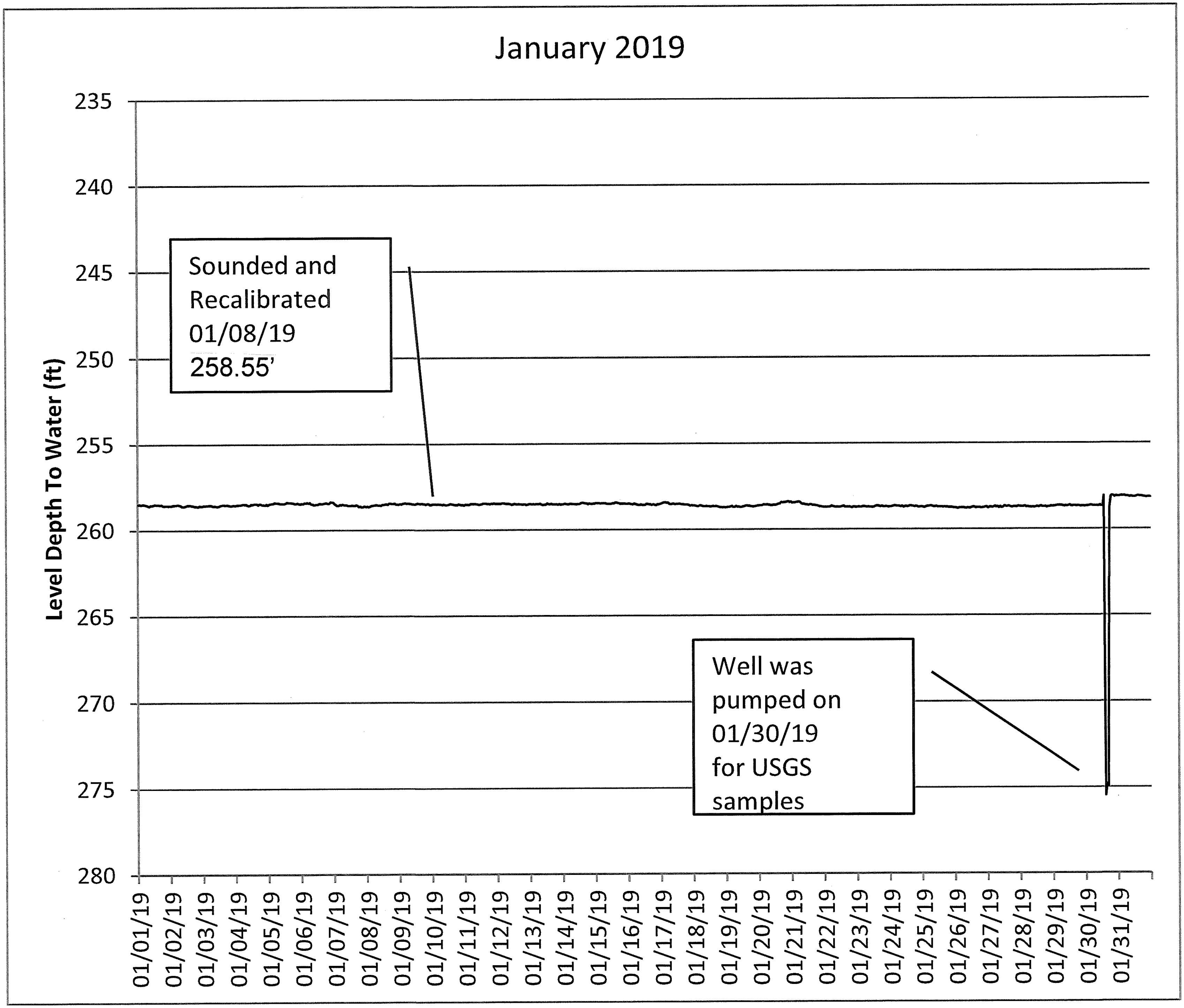

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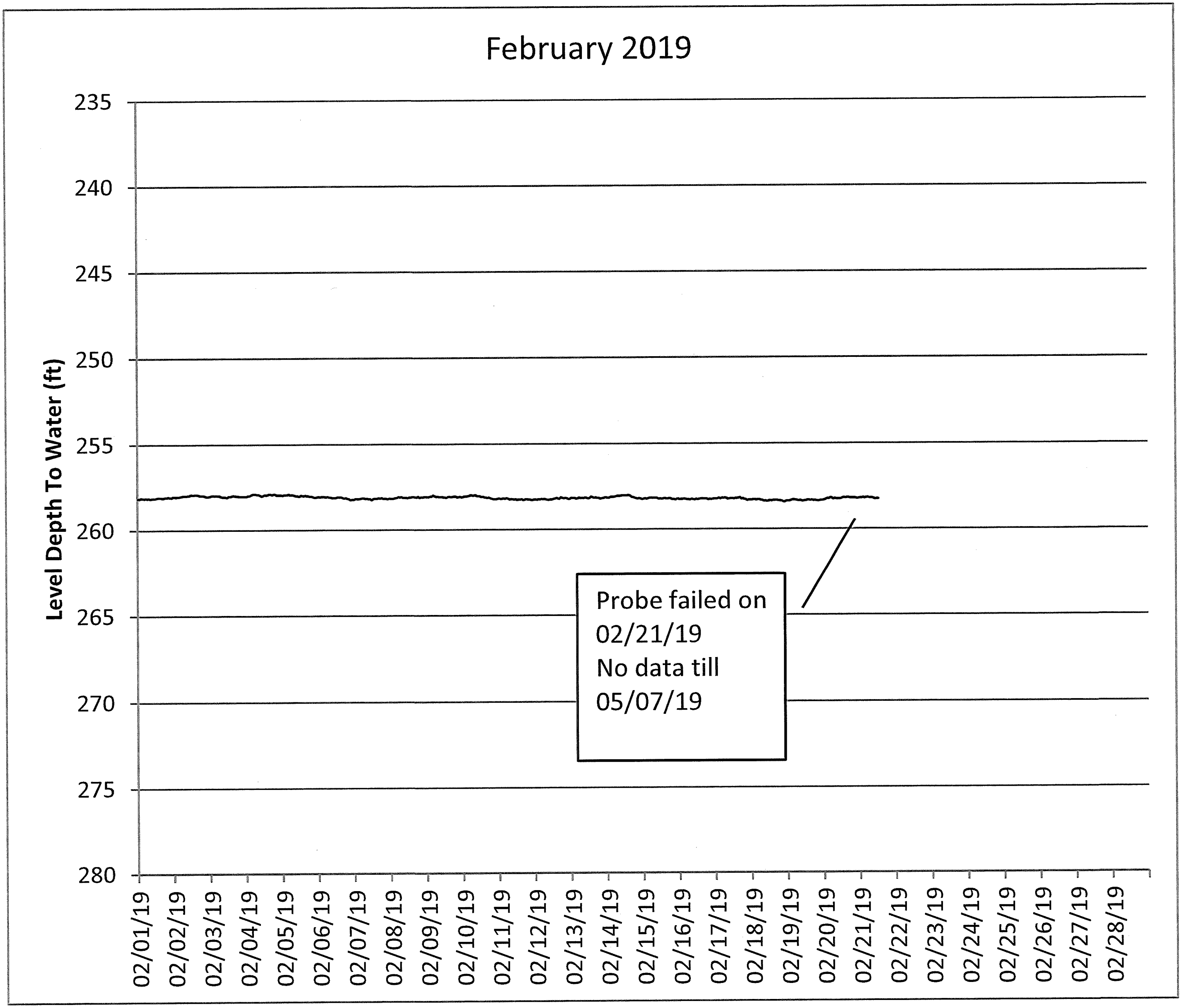

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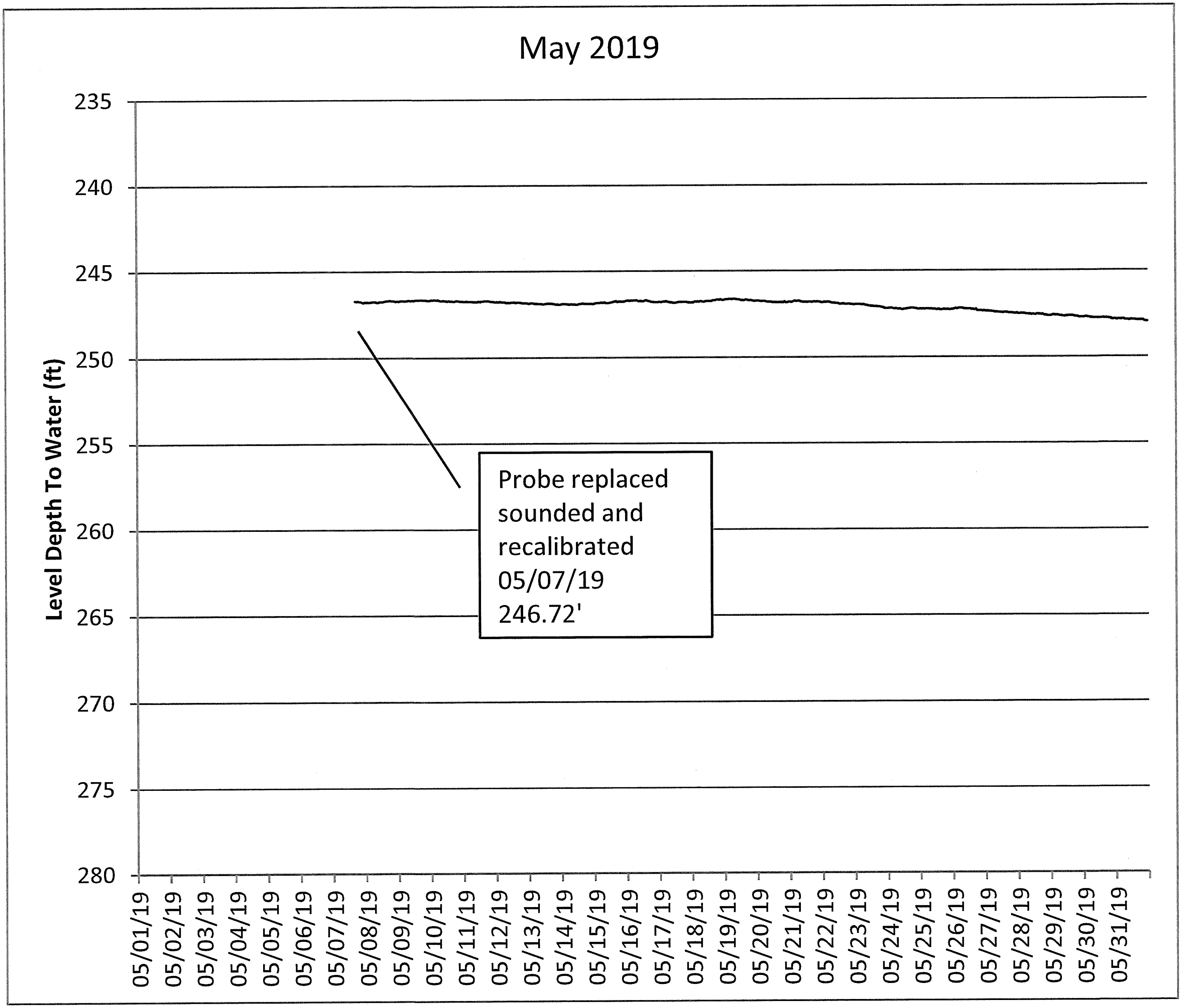

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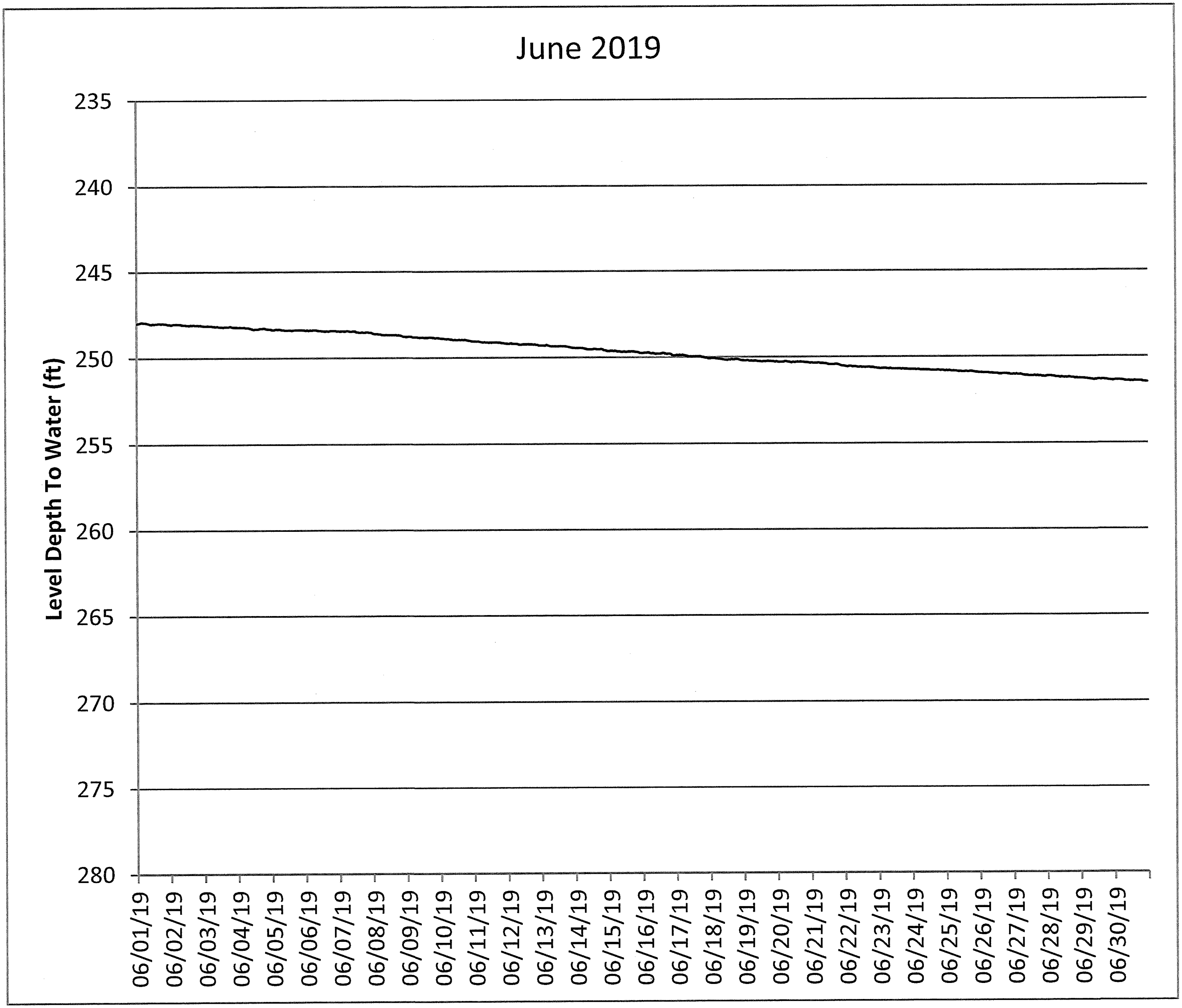

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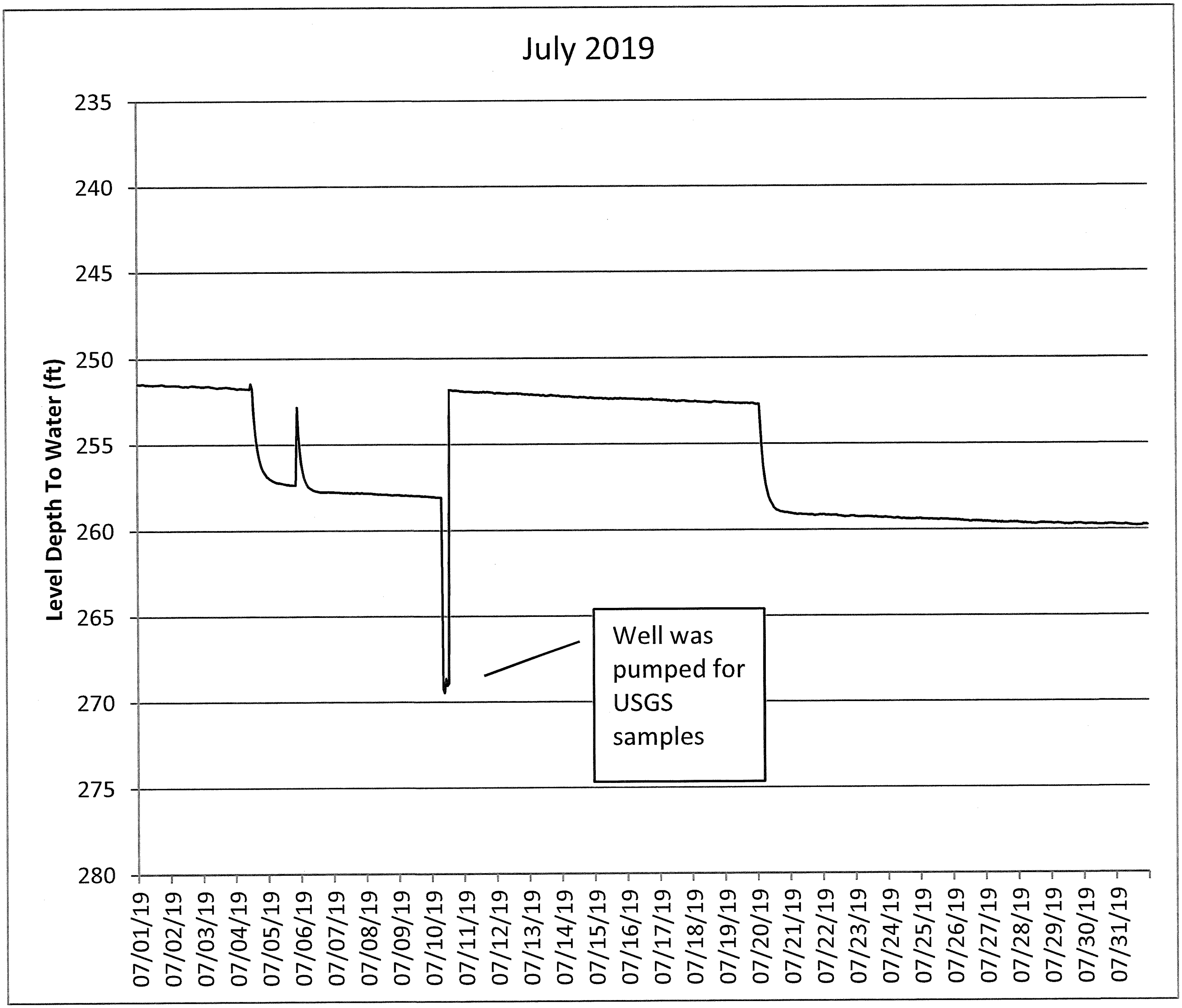

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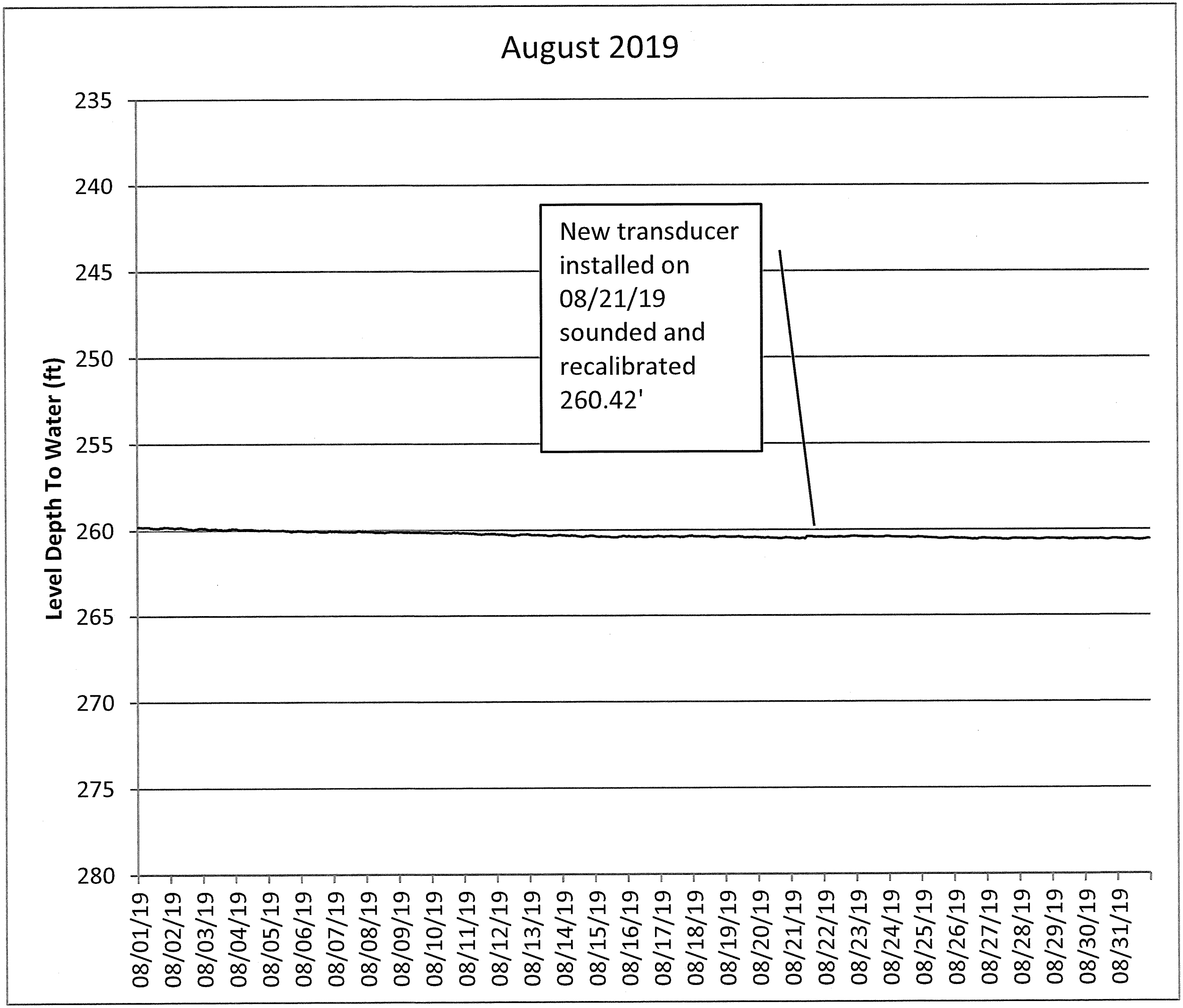

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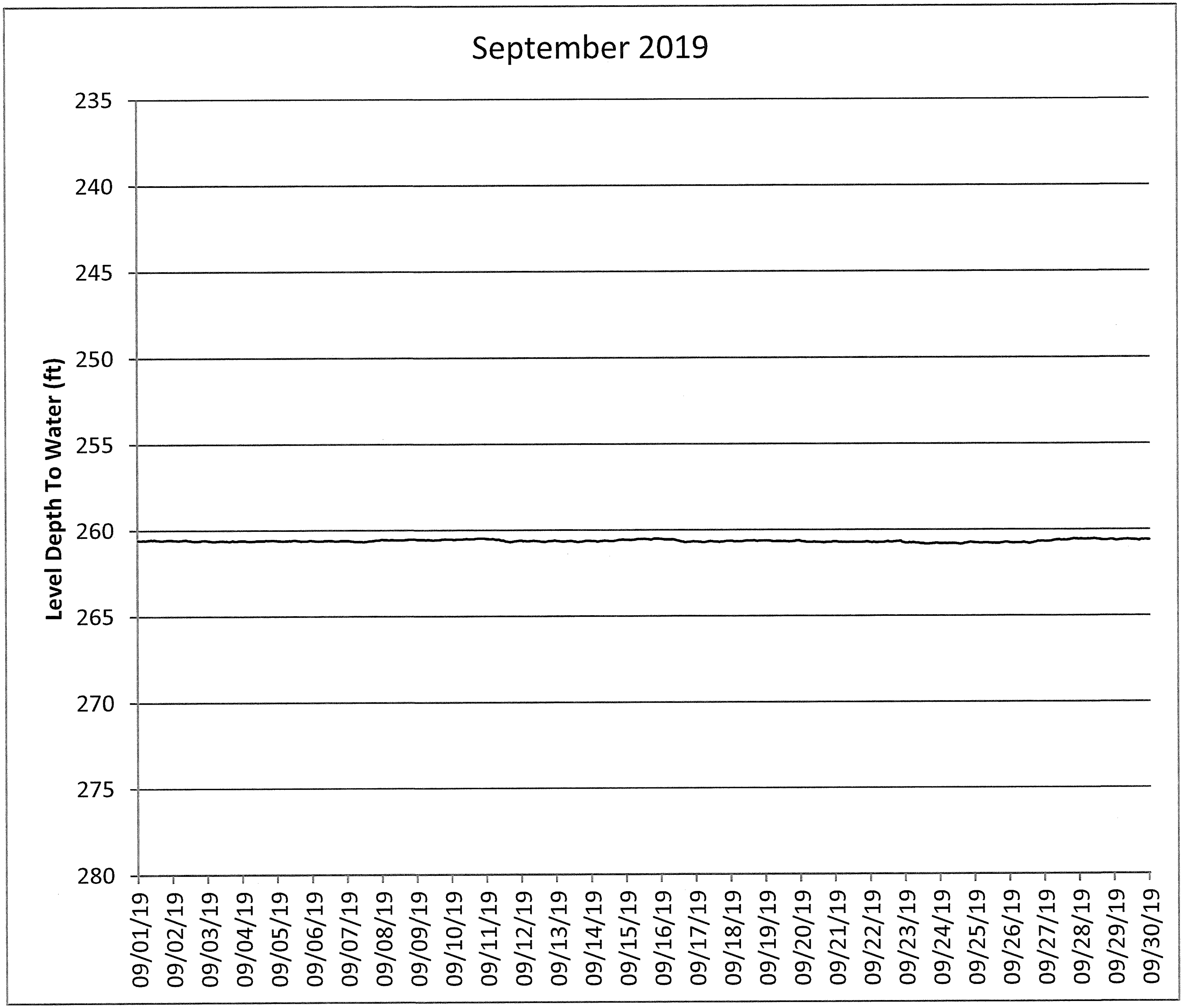

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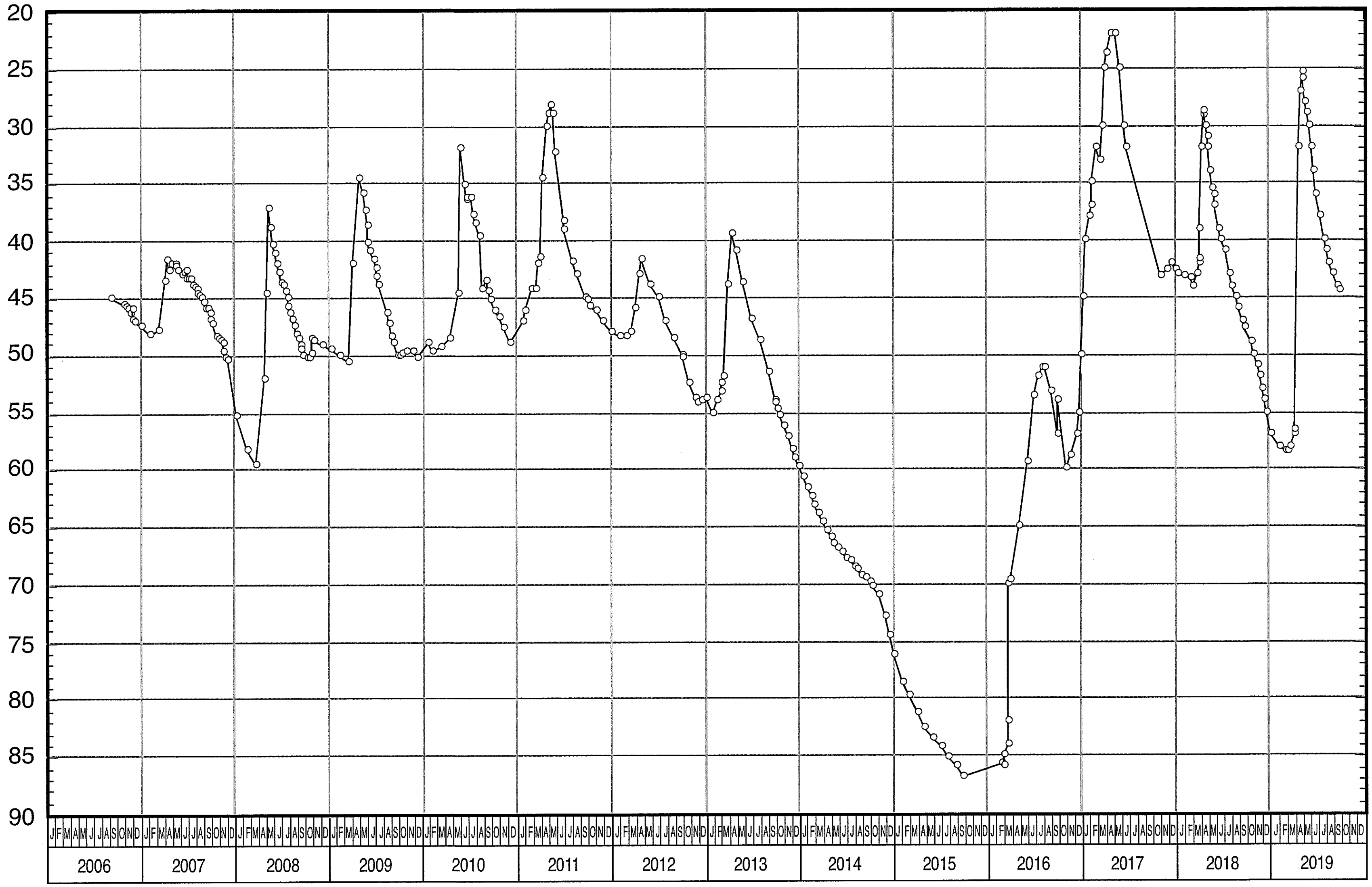
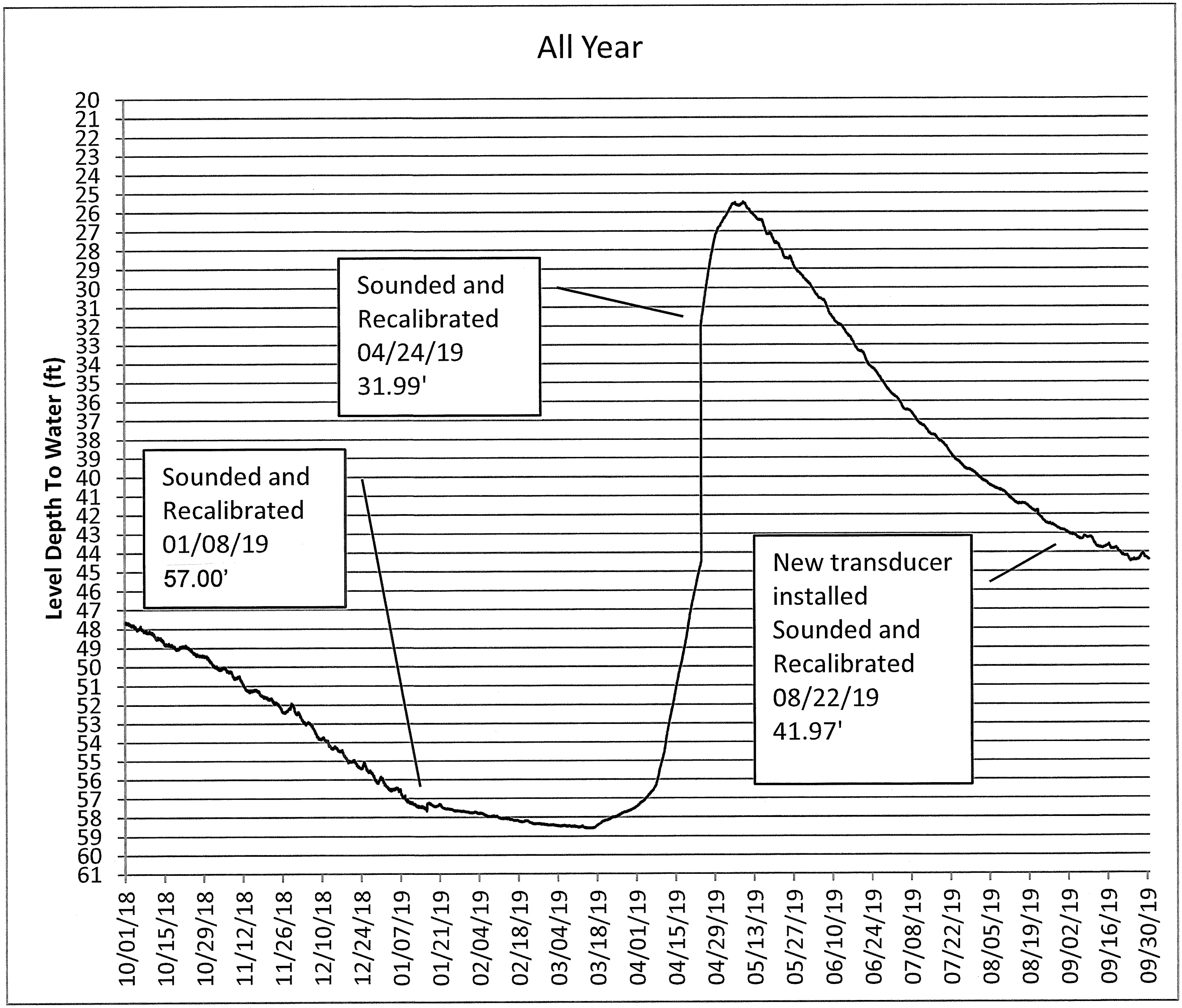
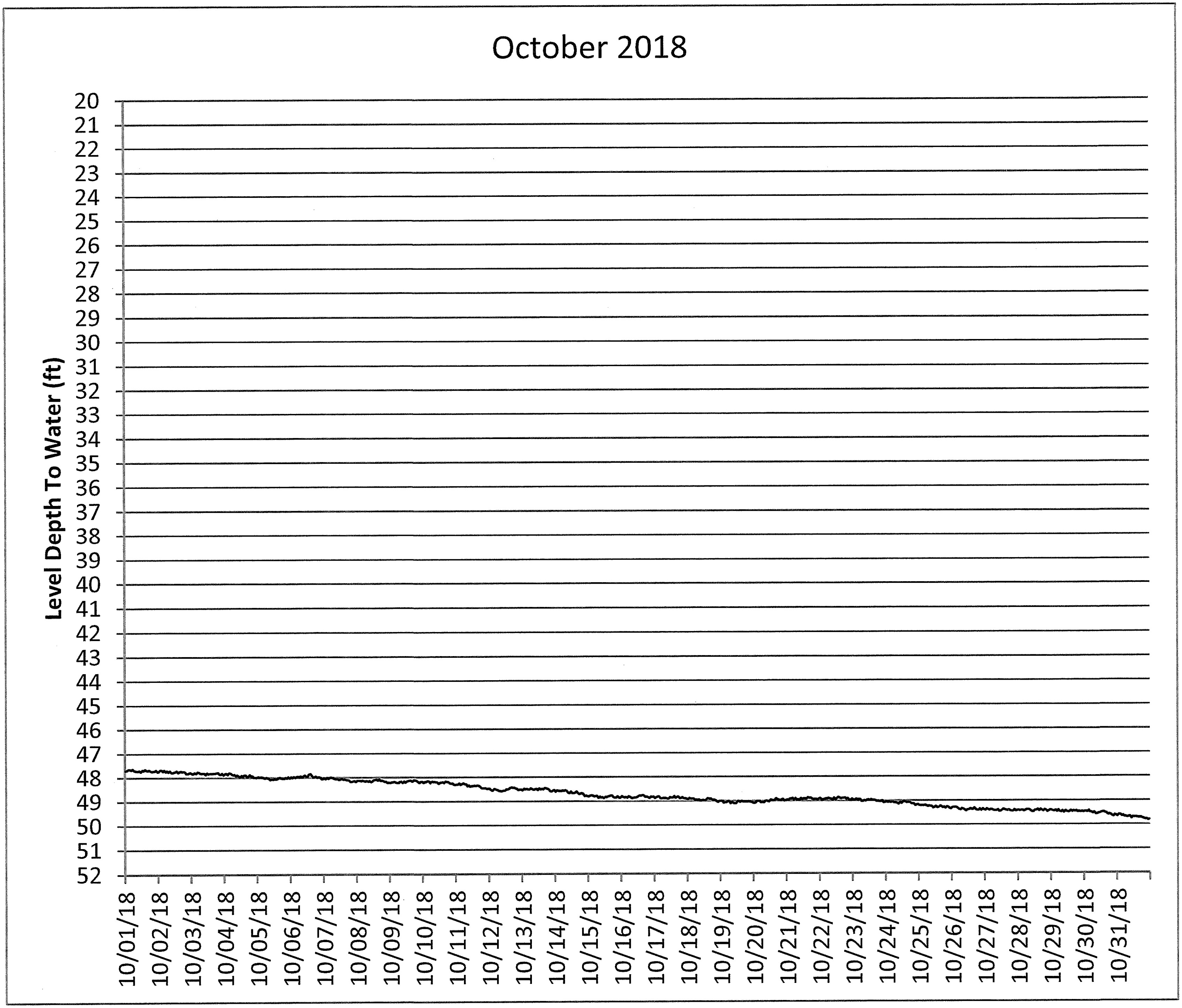


WATER-LEVEL HYDROGRAPH FOR WELL NO. 27



WATER LEVEL HYDROGRAPH FOR MW-27M



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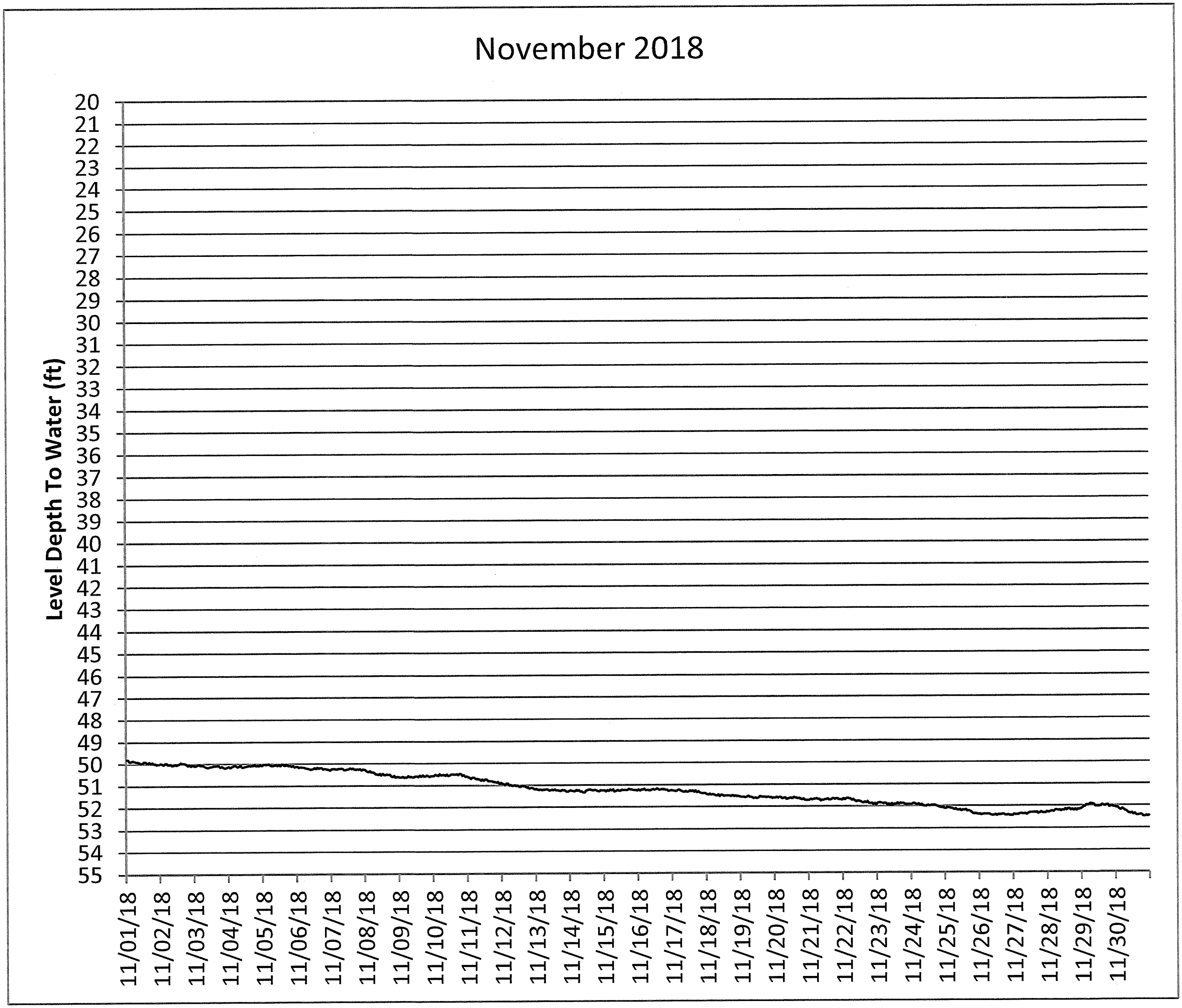

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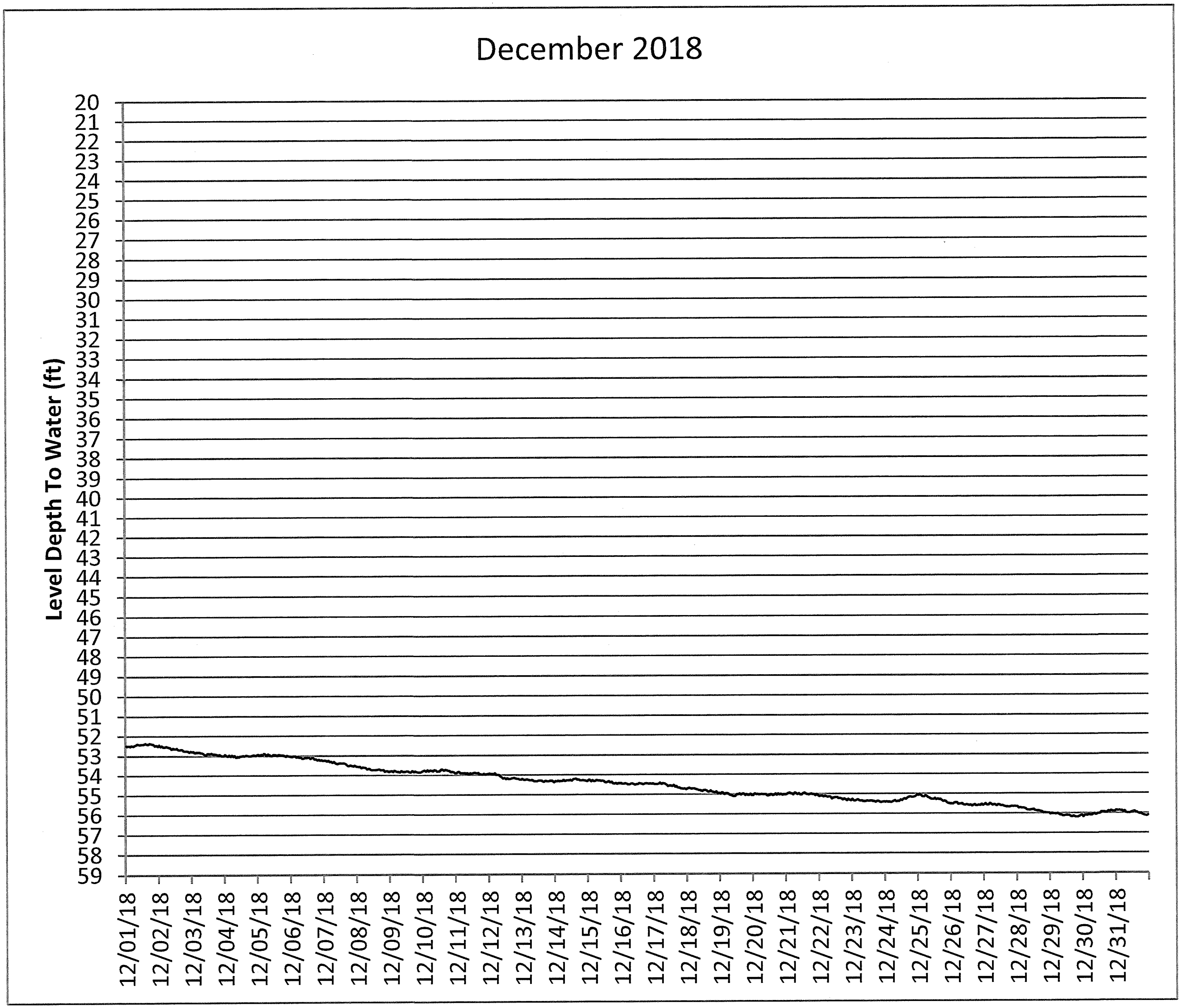

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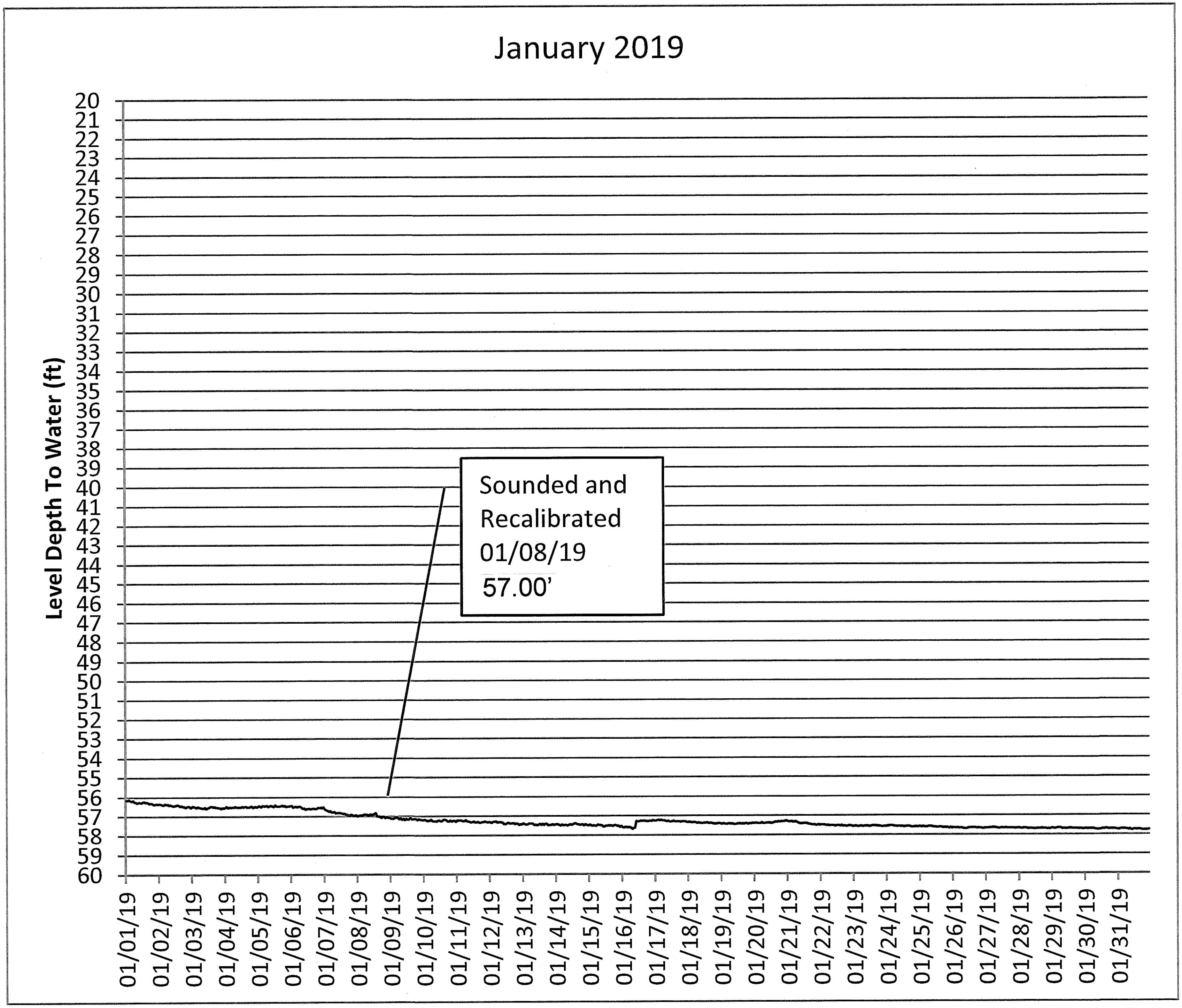

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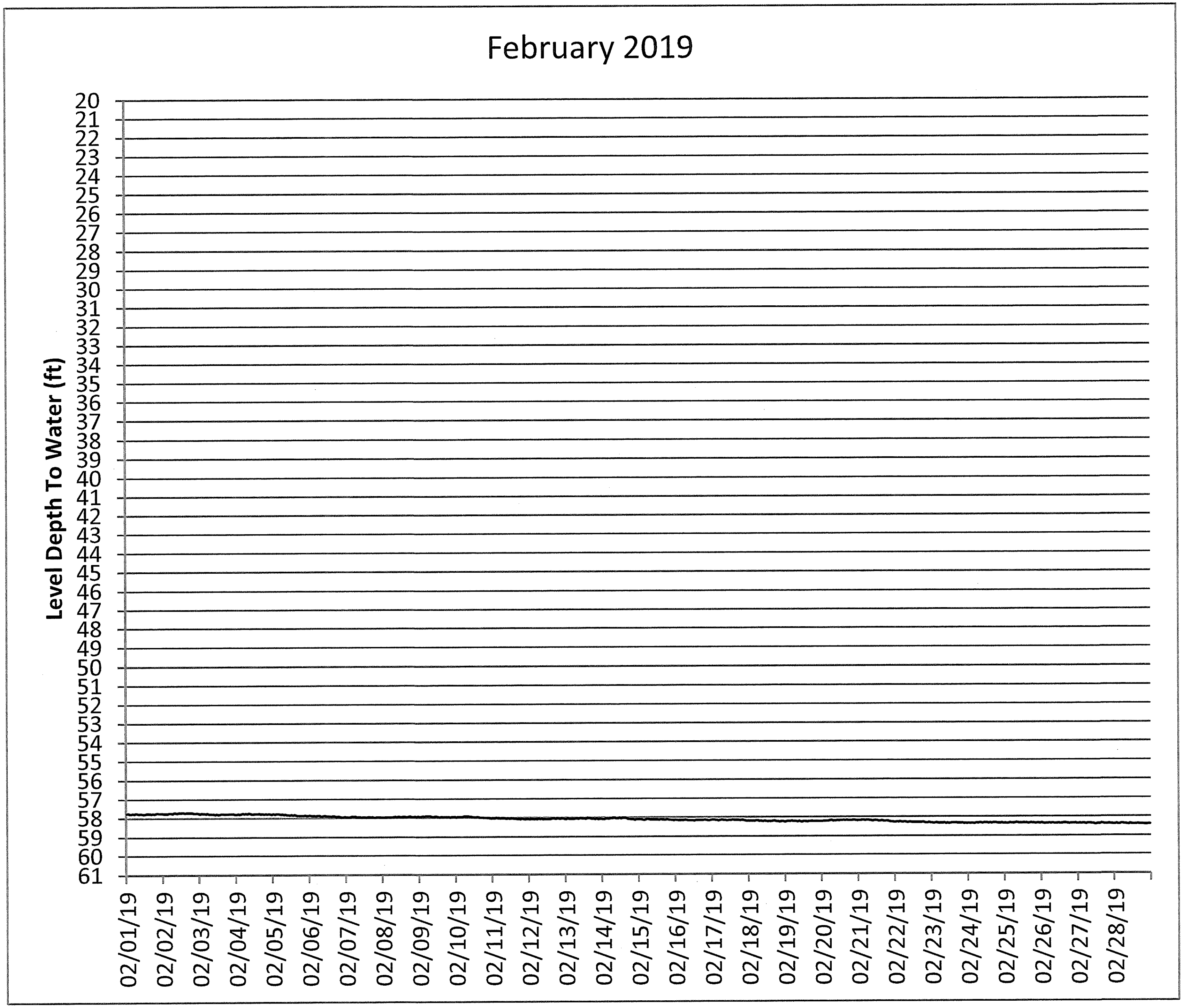

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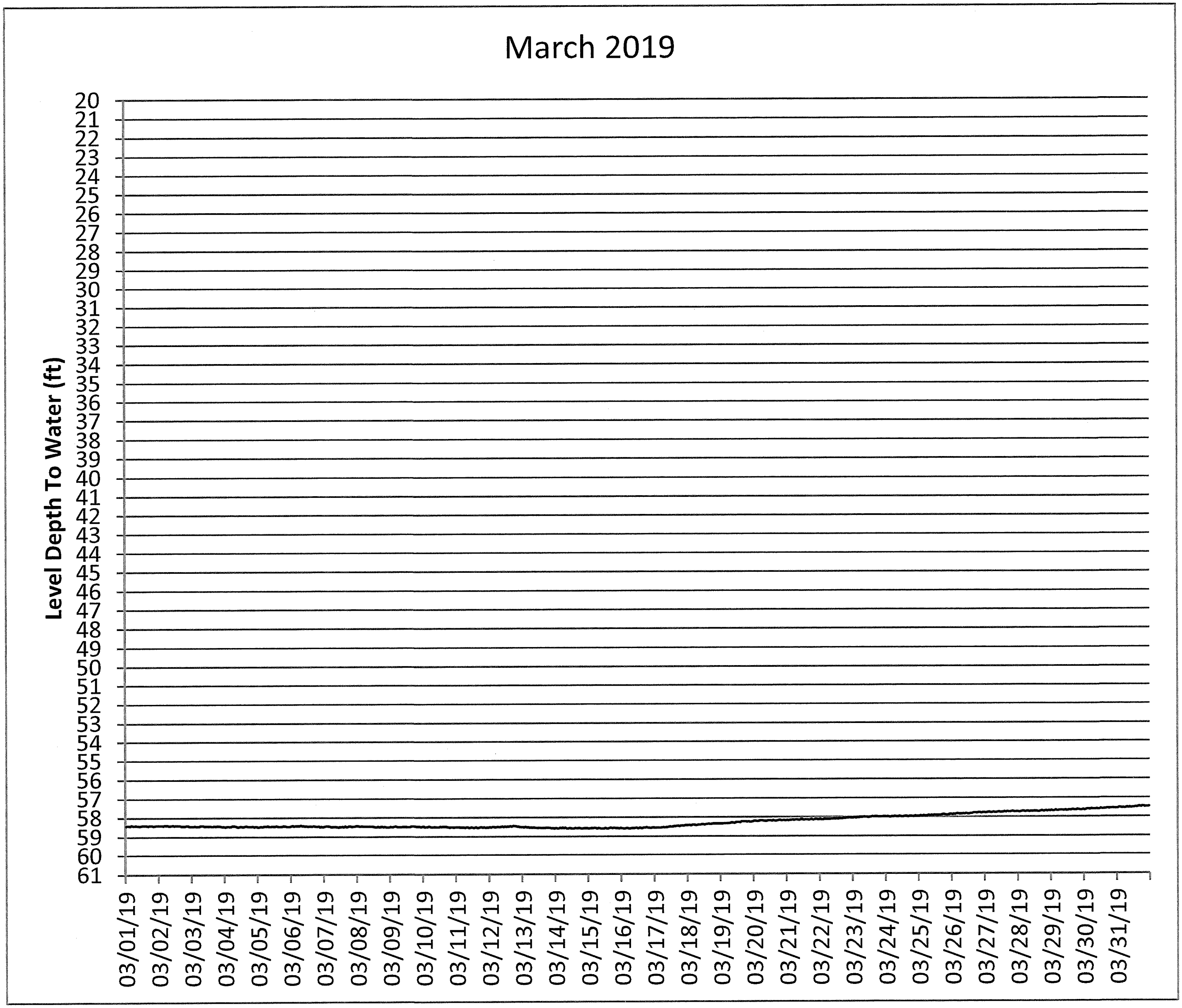

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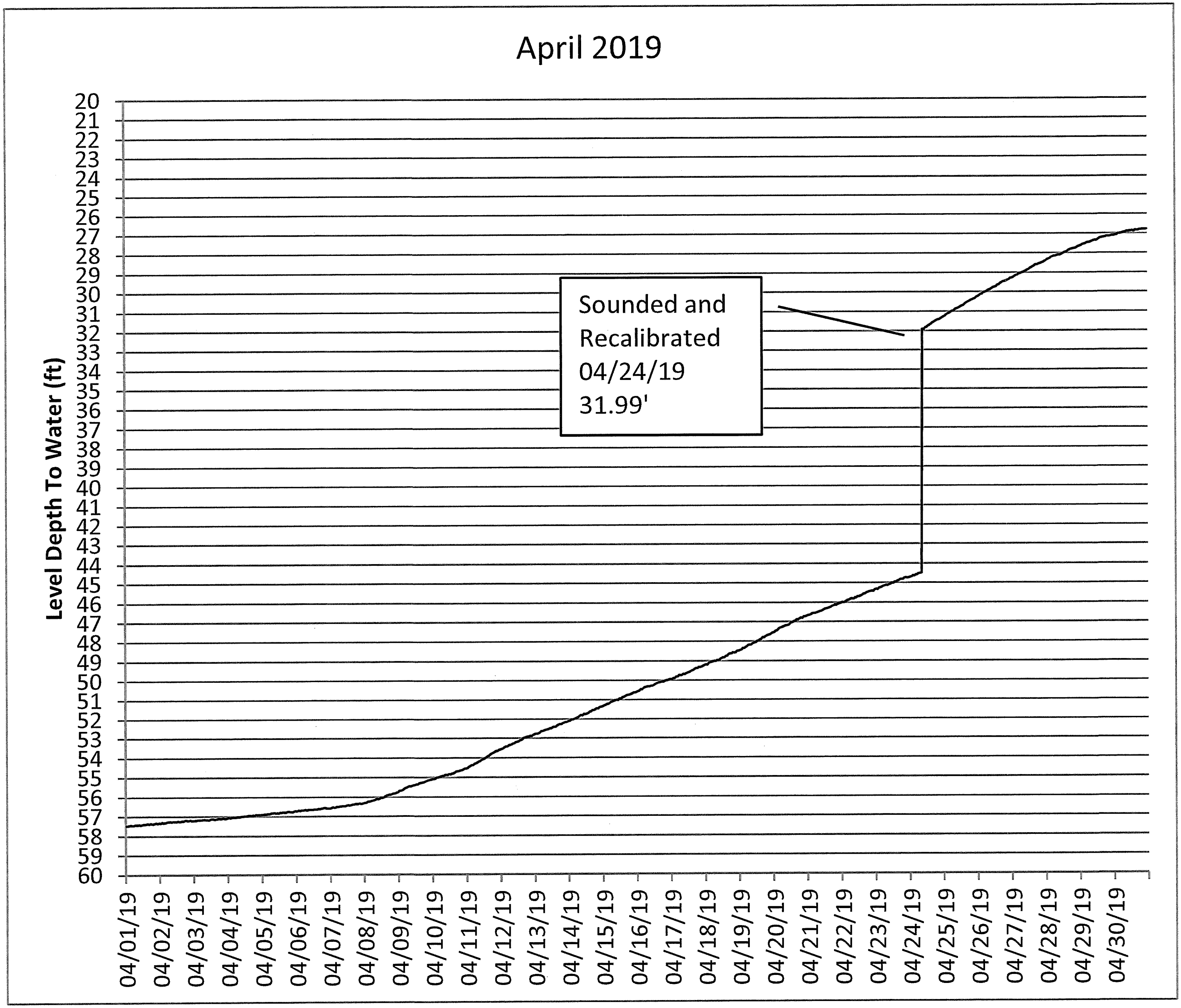

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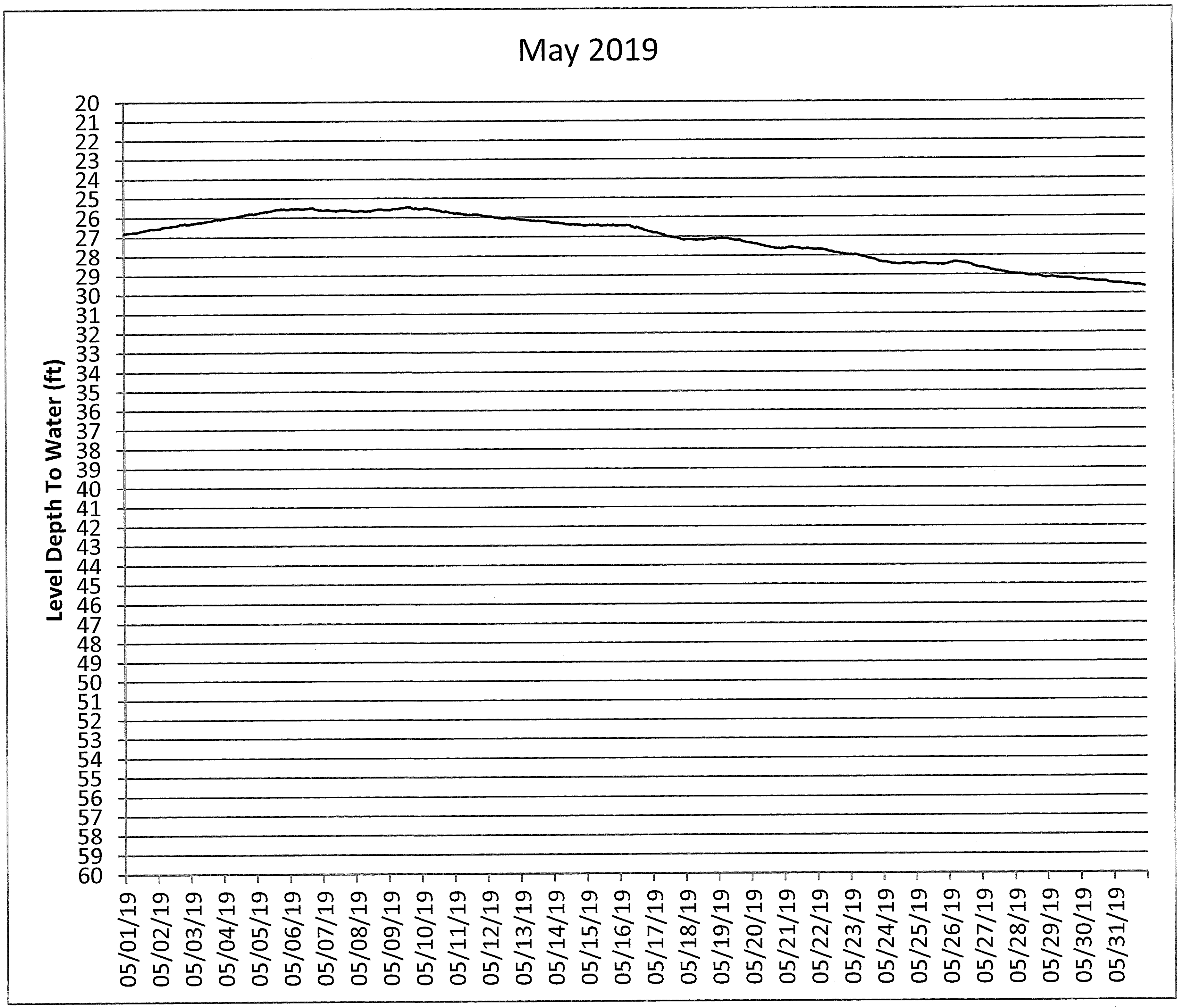

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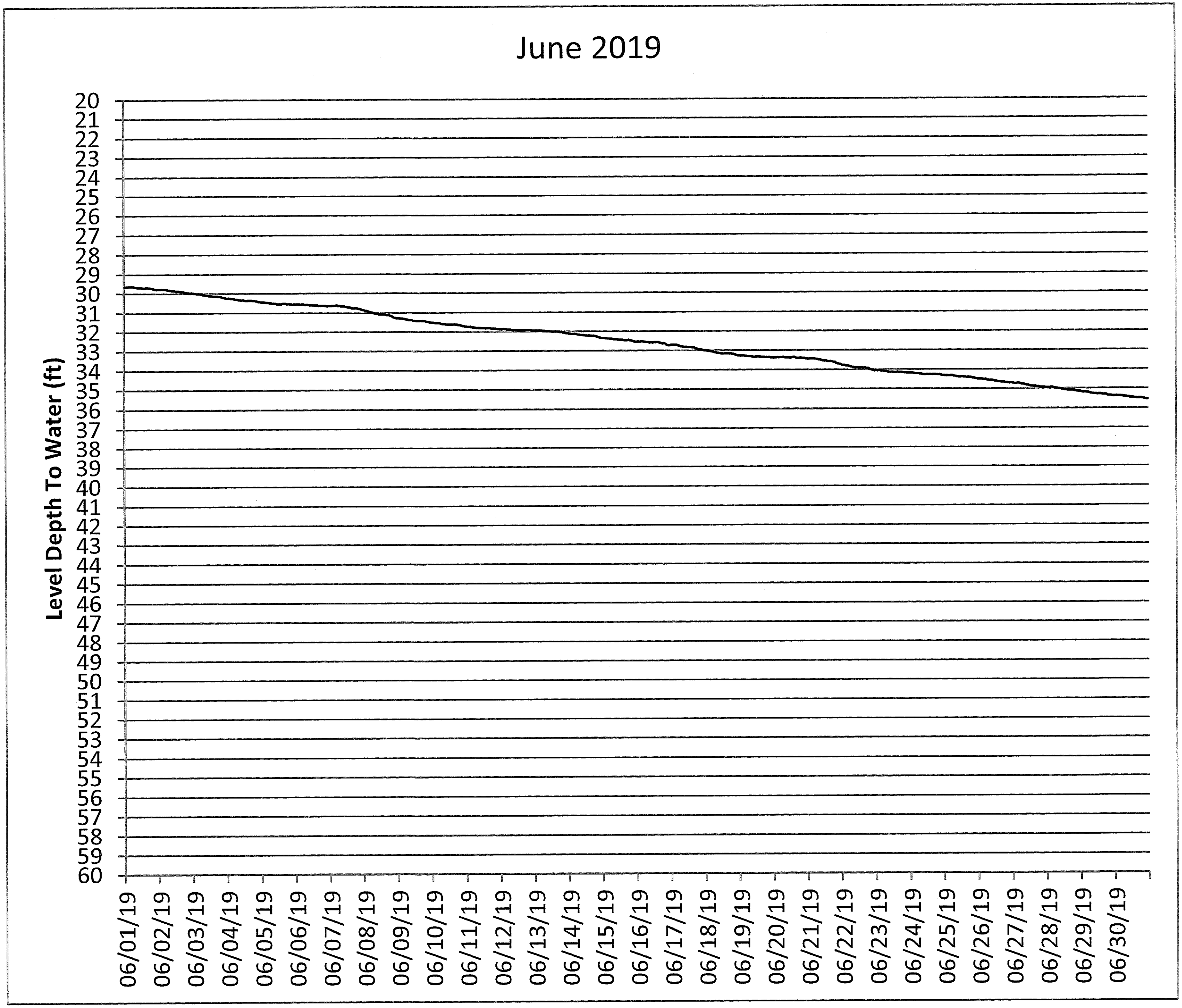

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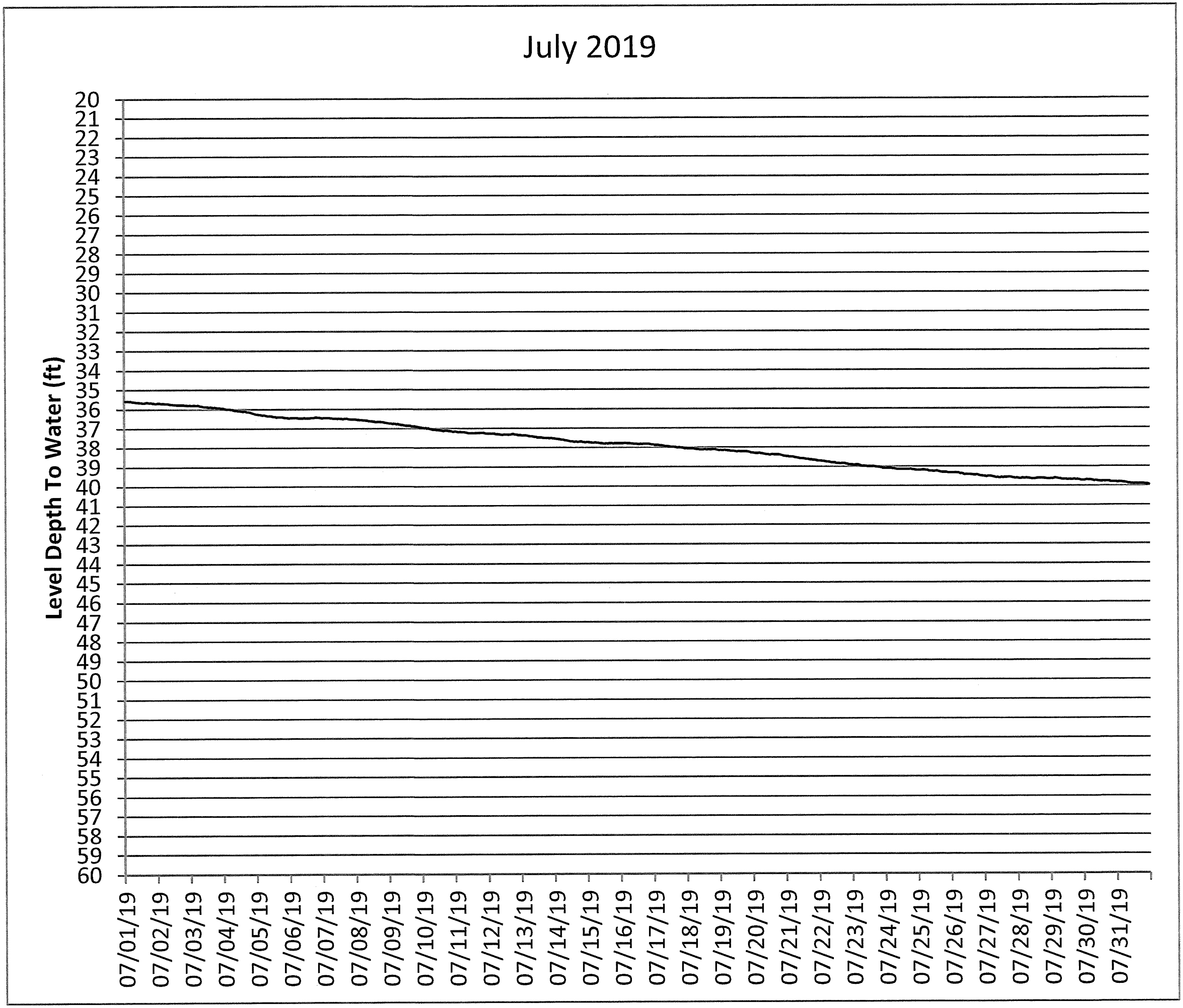

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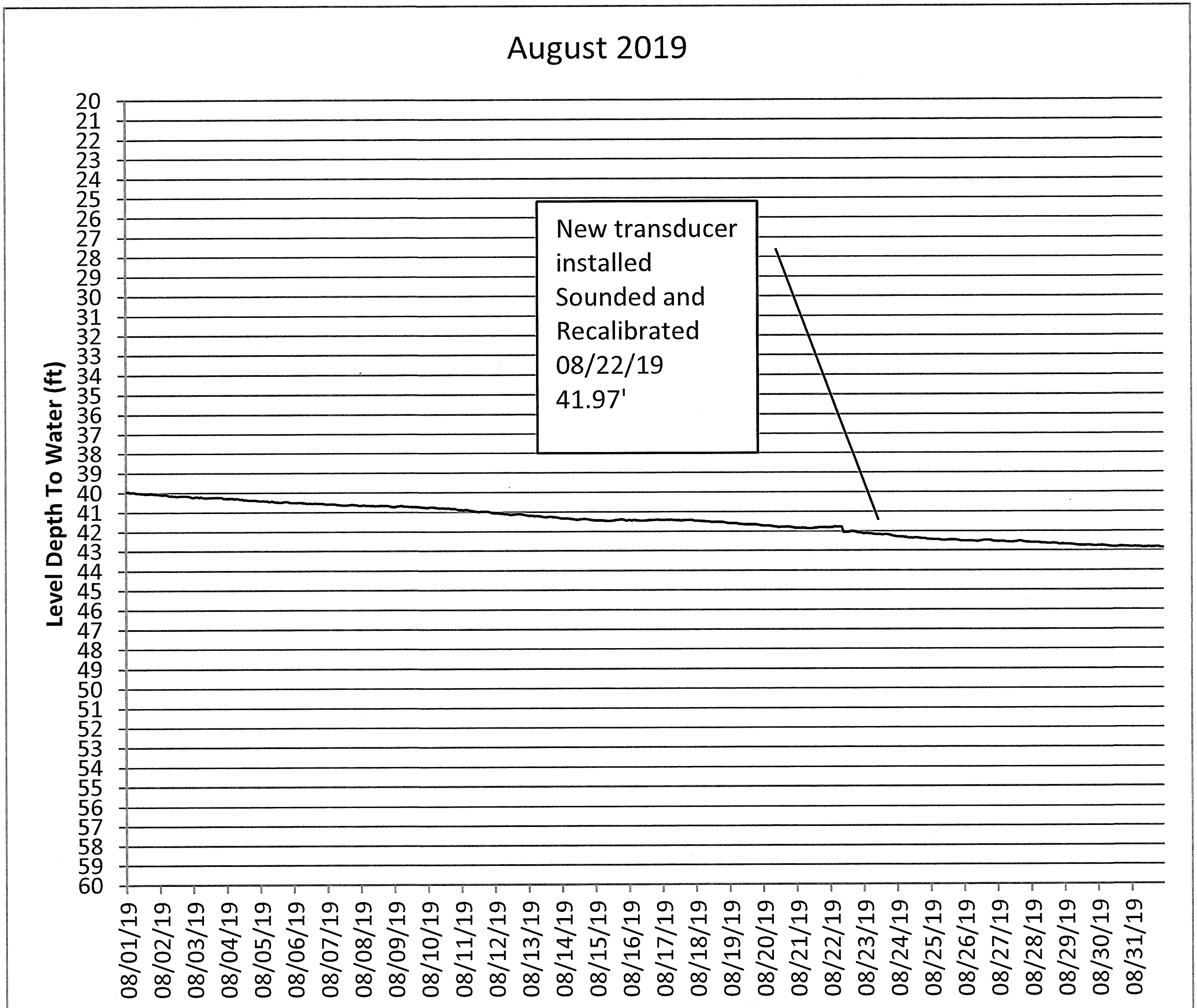

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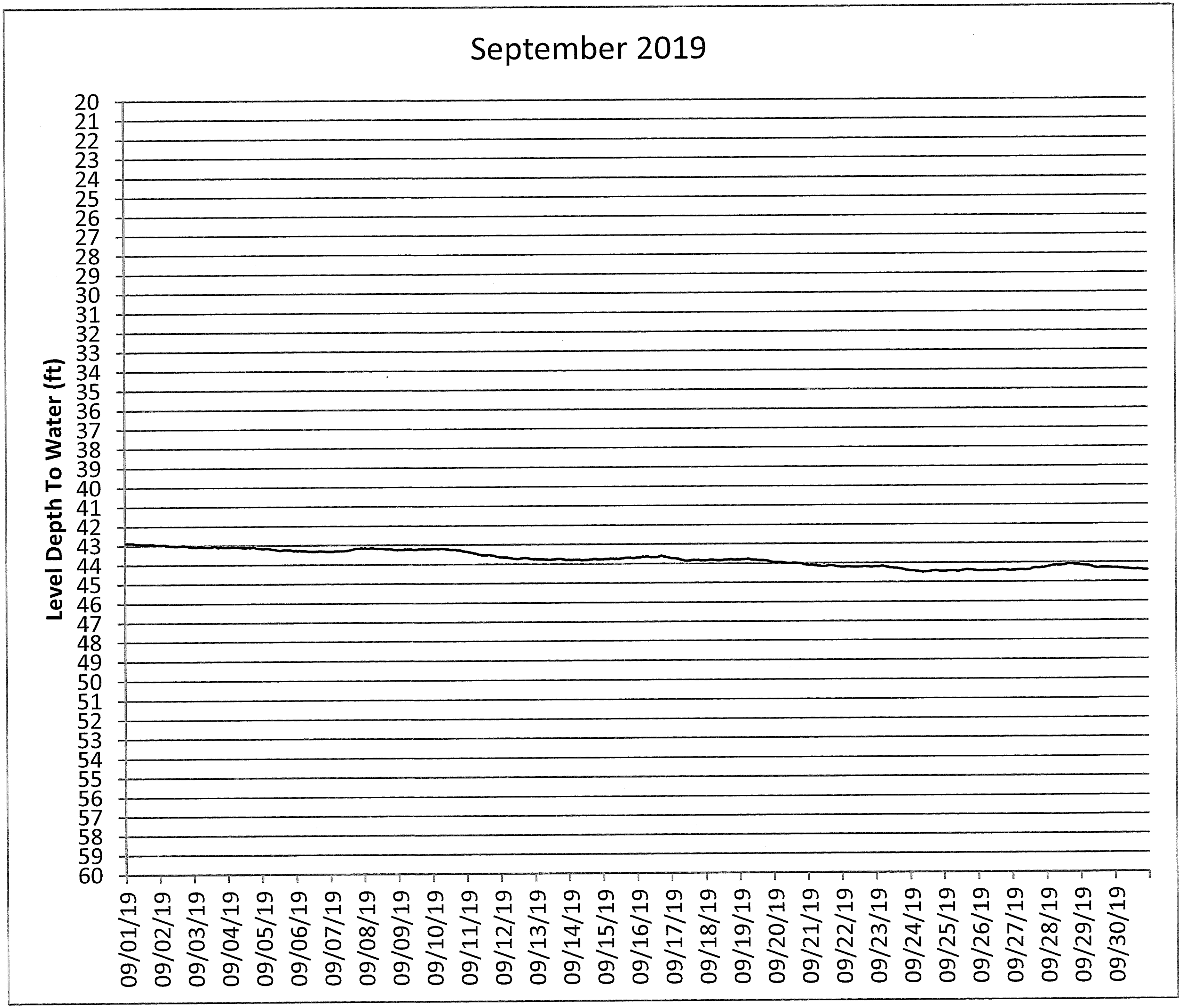

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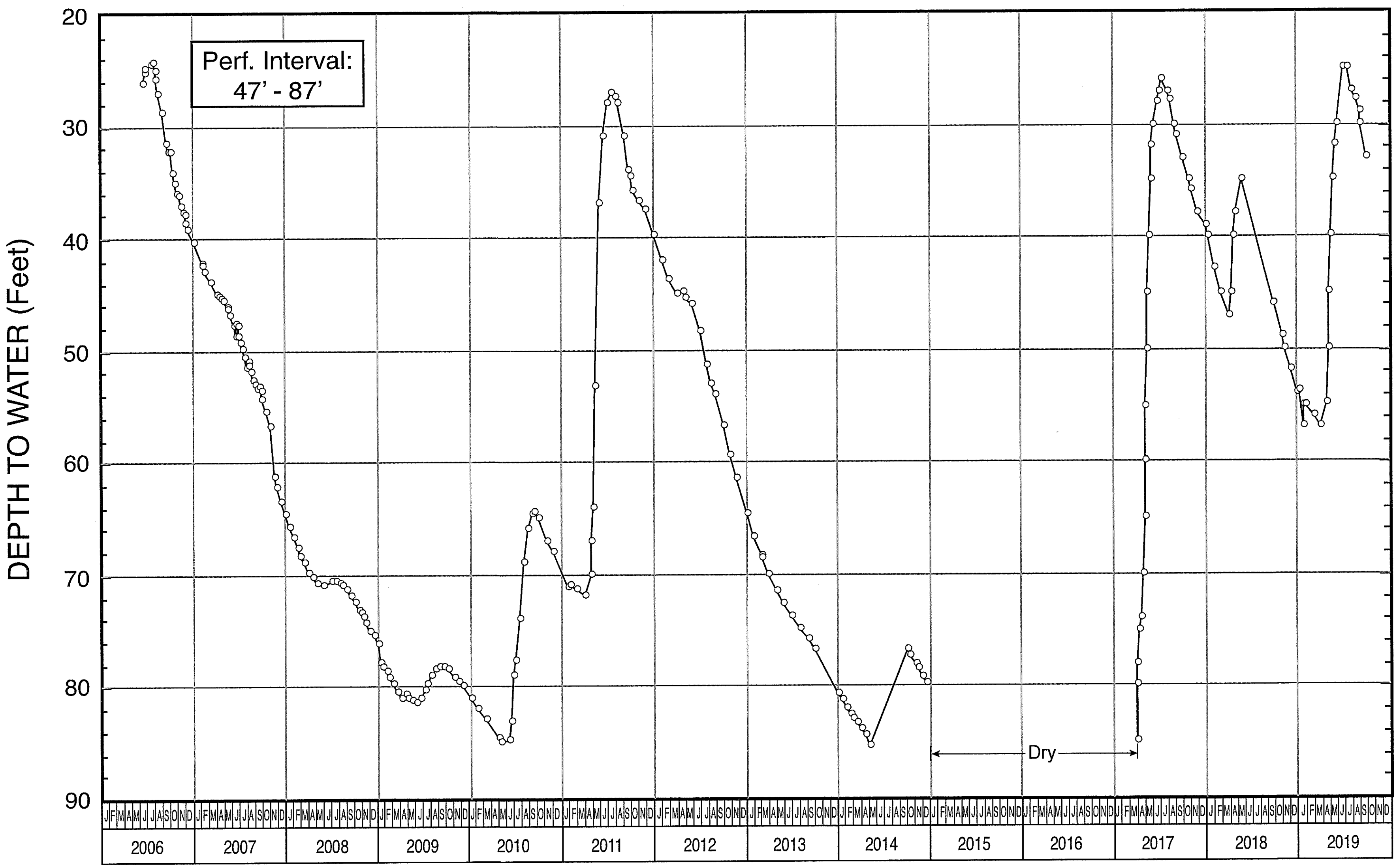
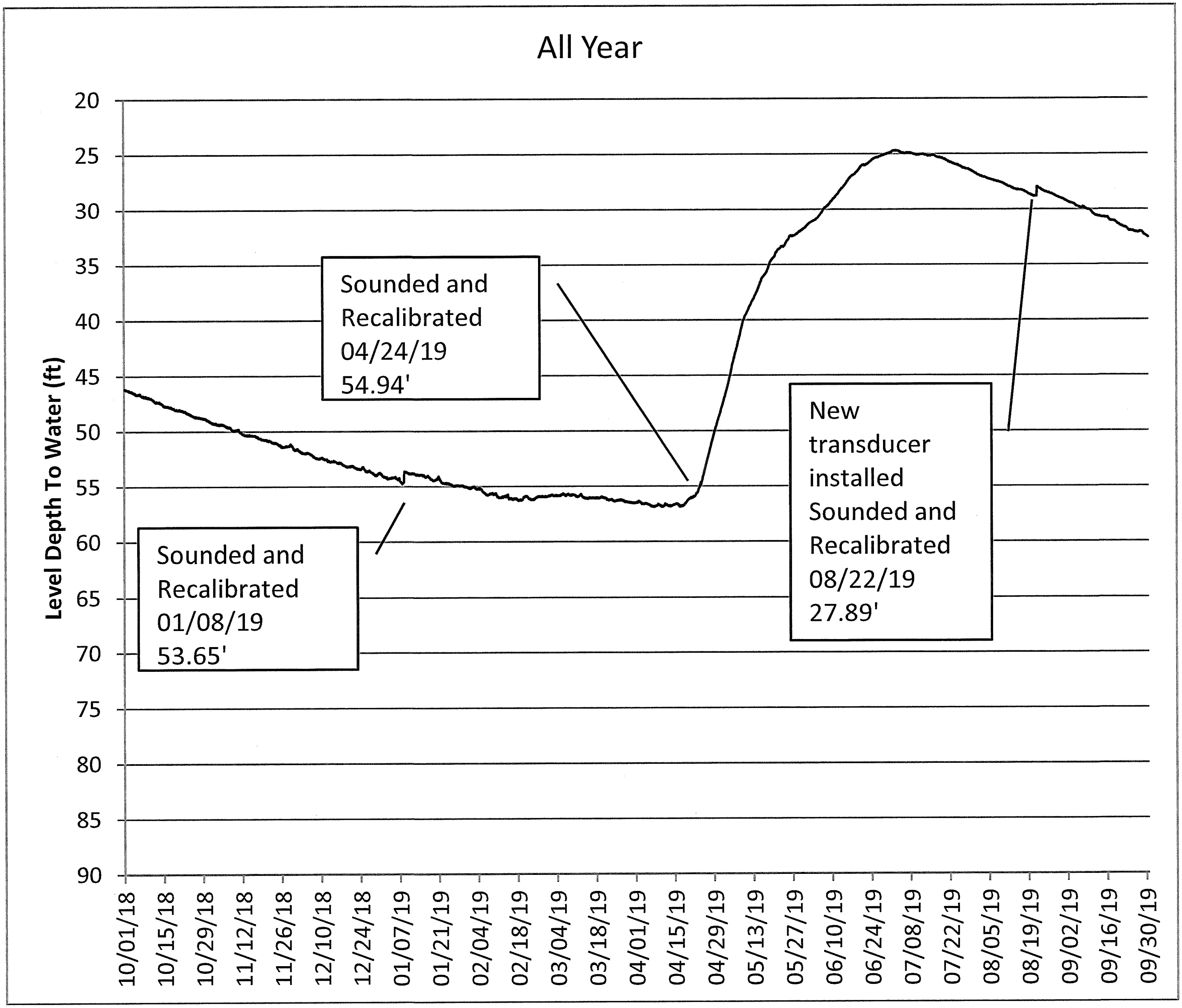
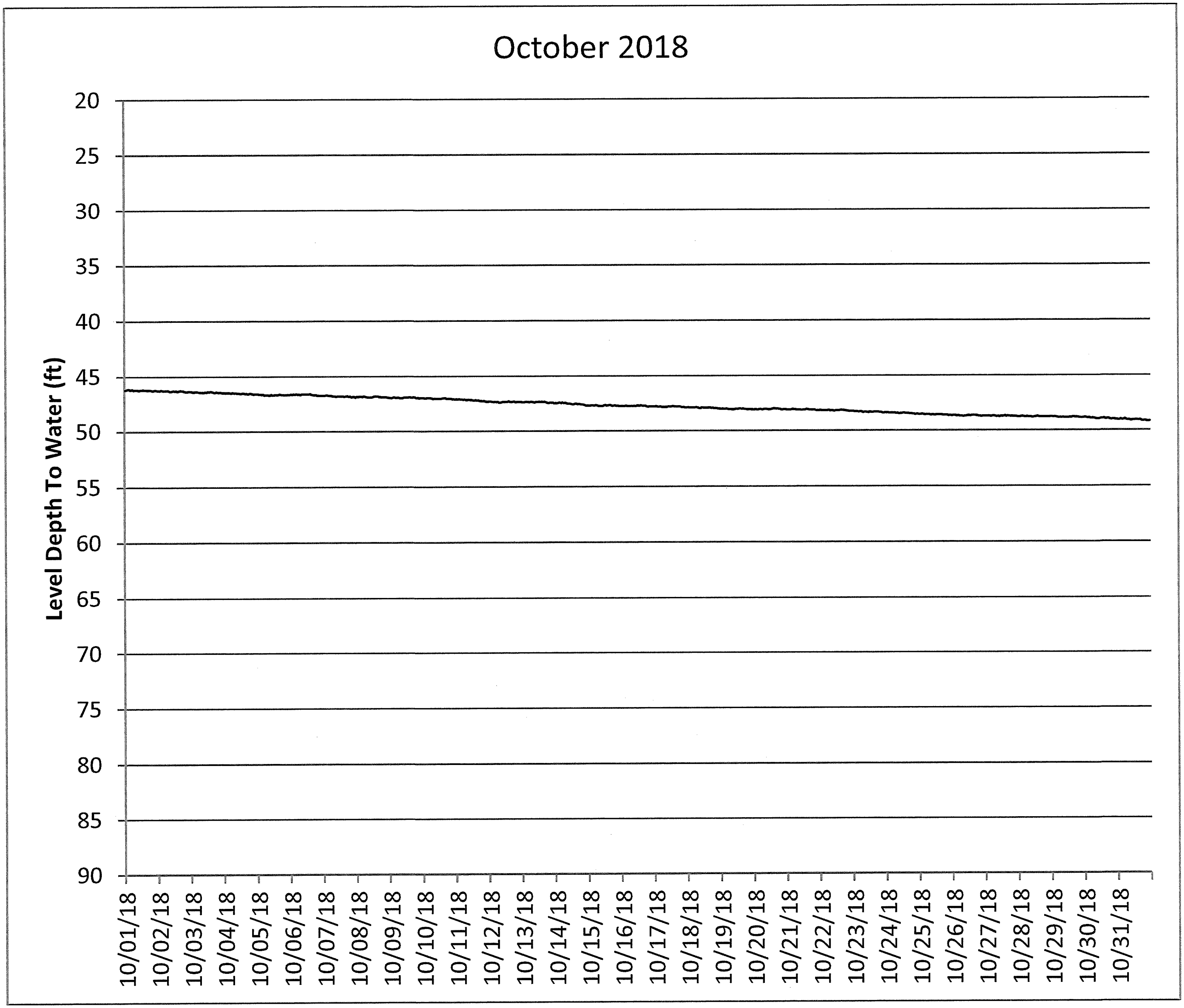


WATER-LEVEL HYDROGRAPH FOR WELL NO. 28



WATER LEVEL HYDROGRAPH FOR MW-28M



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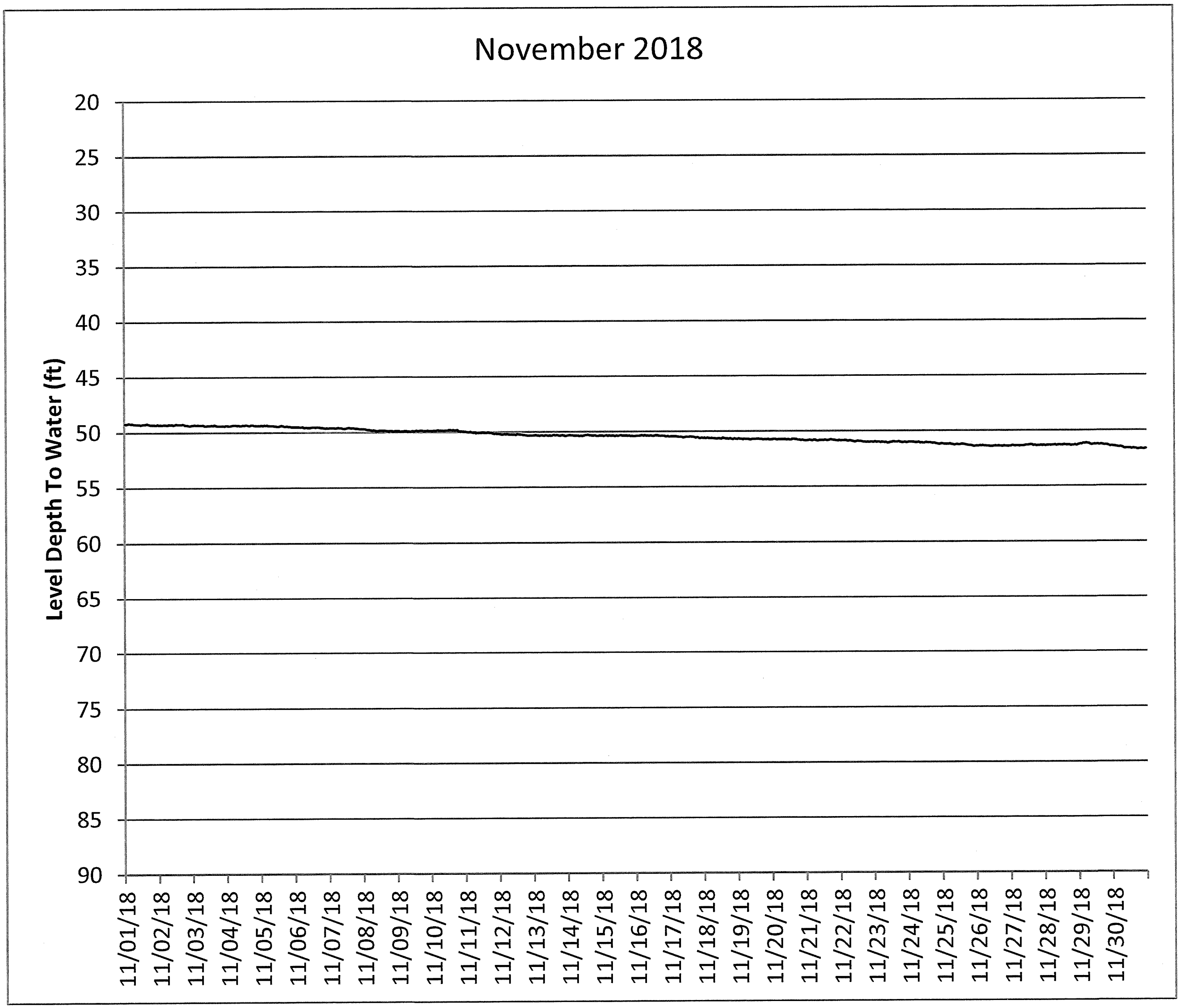

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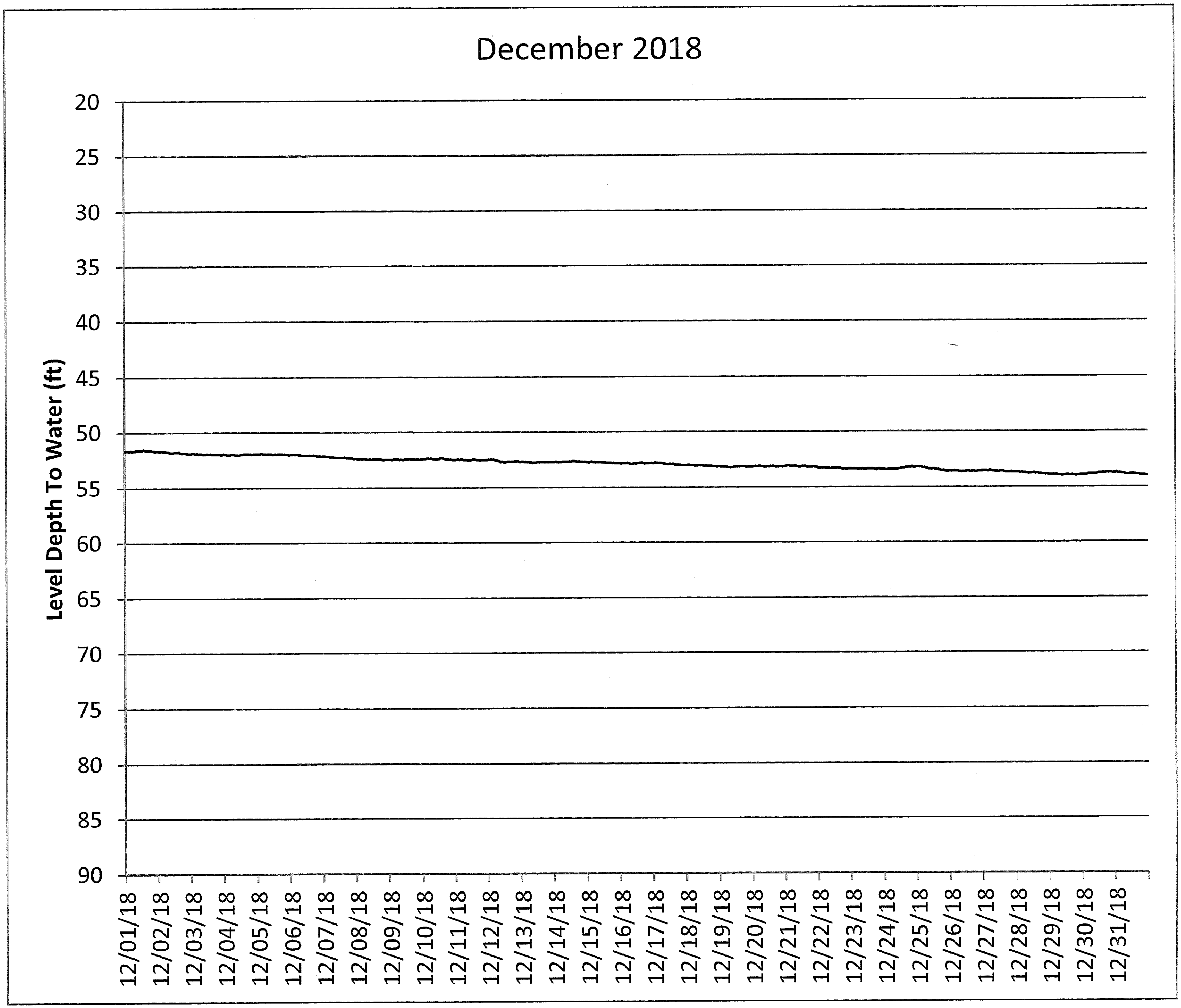

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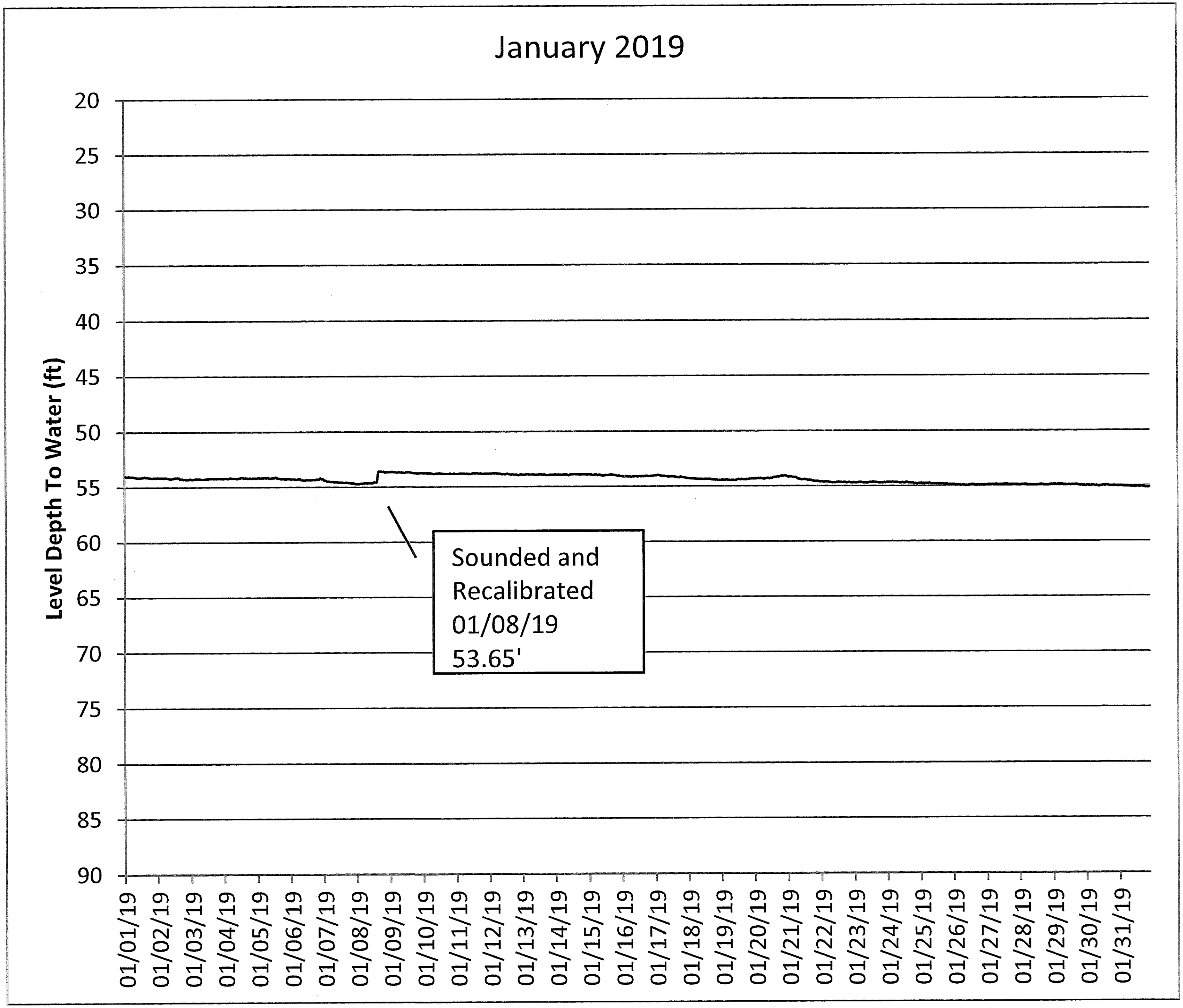

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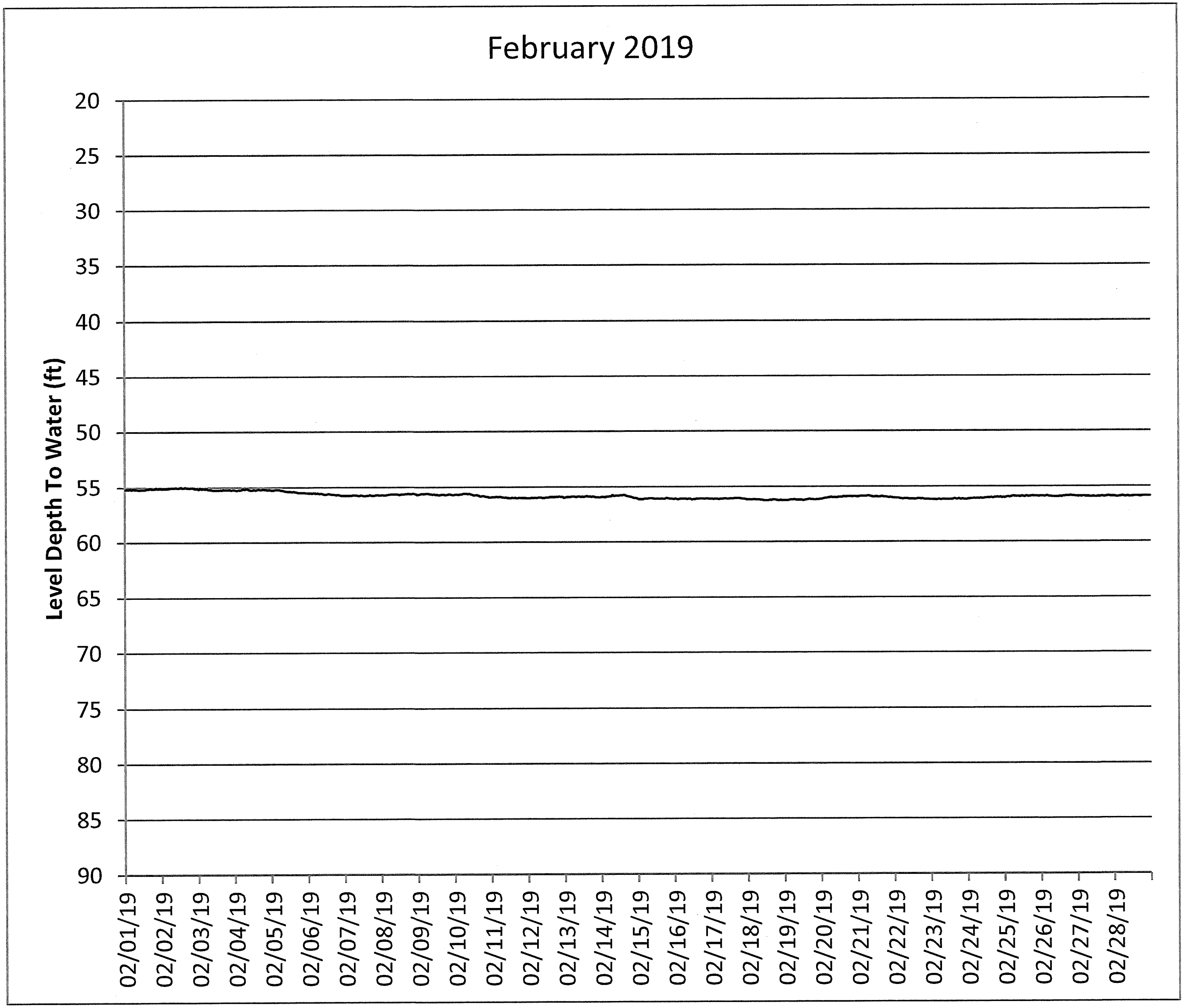

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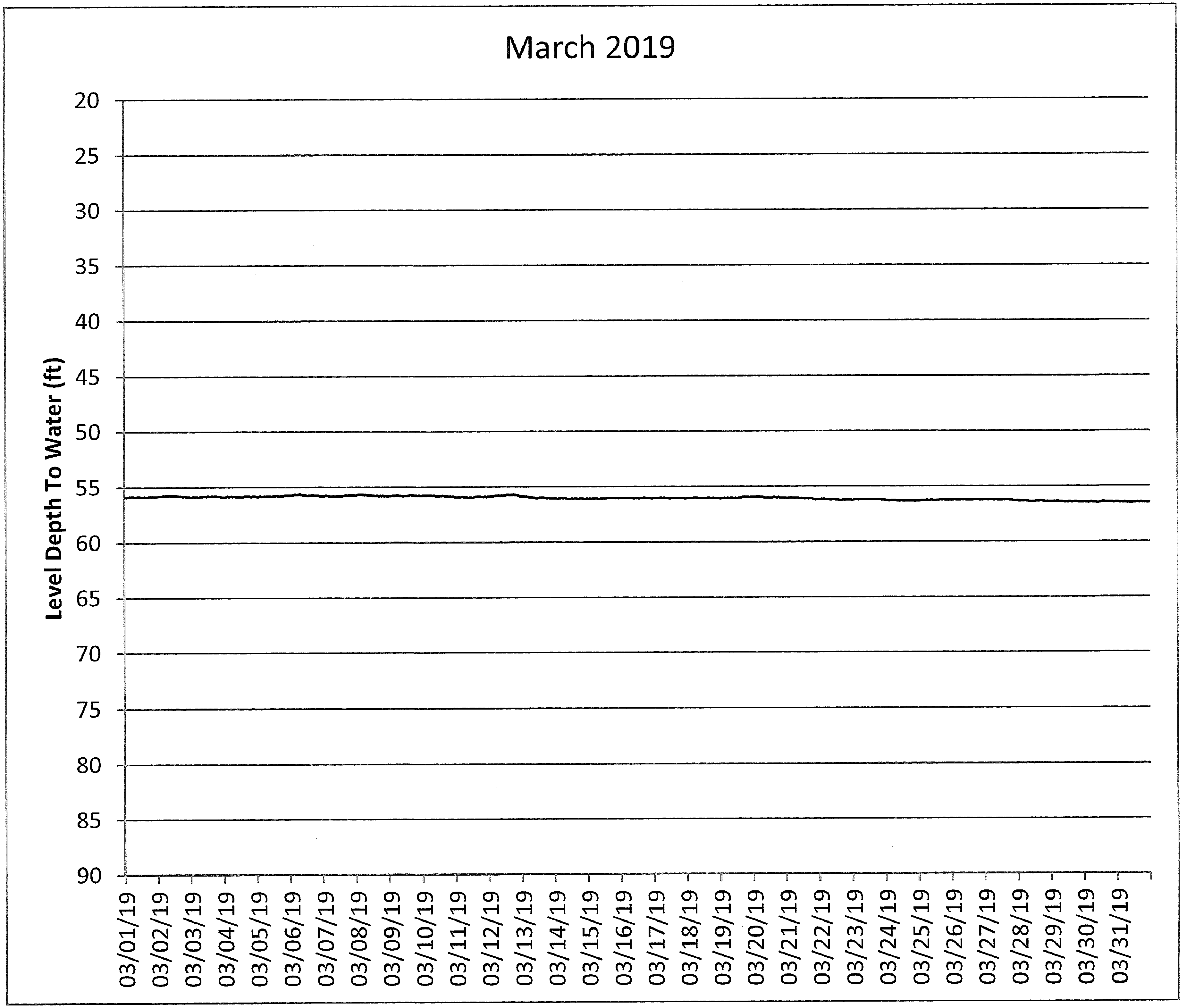

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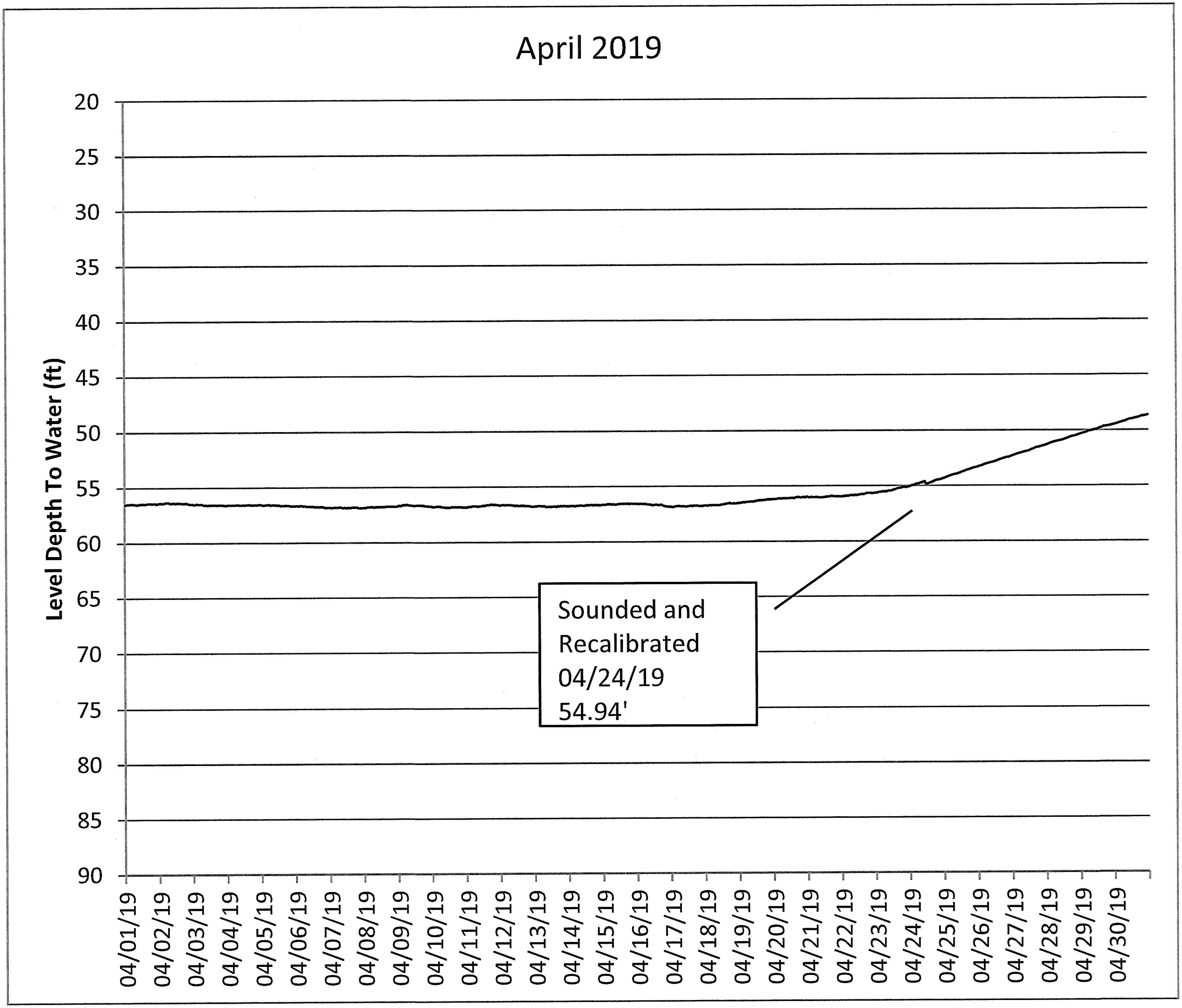

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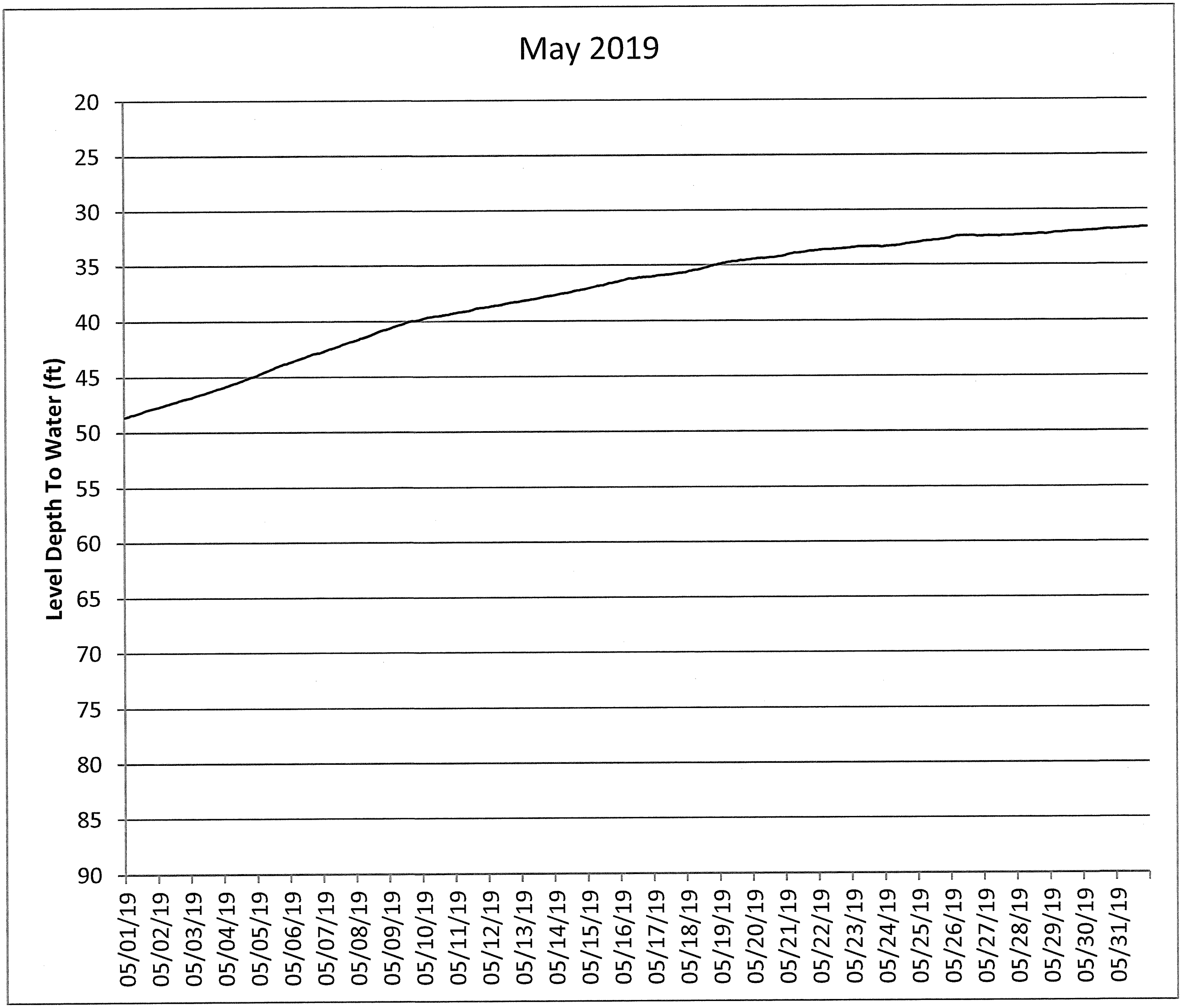

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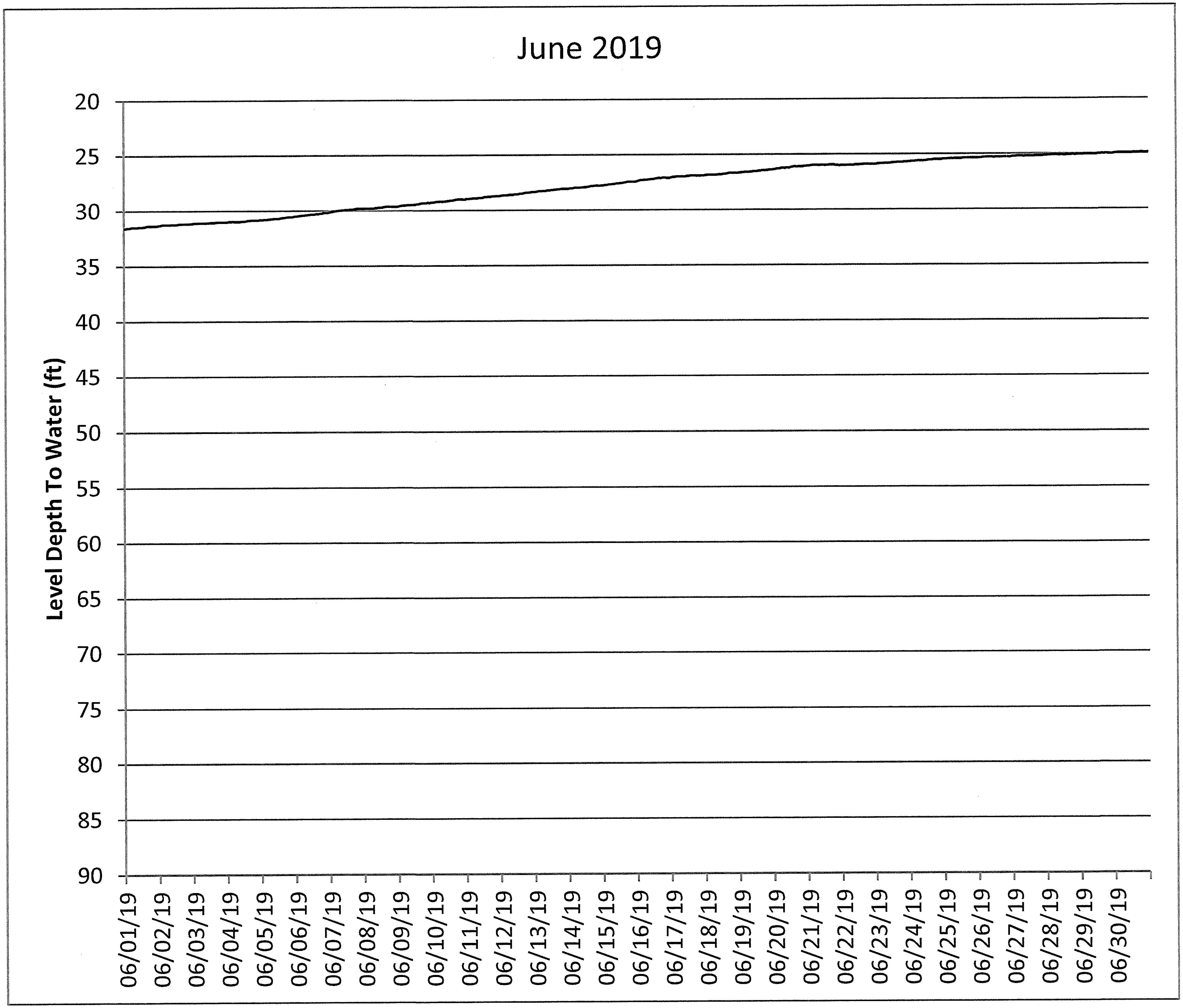

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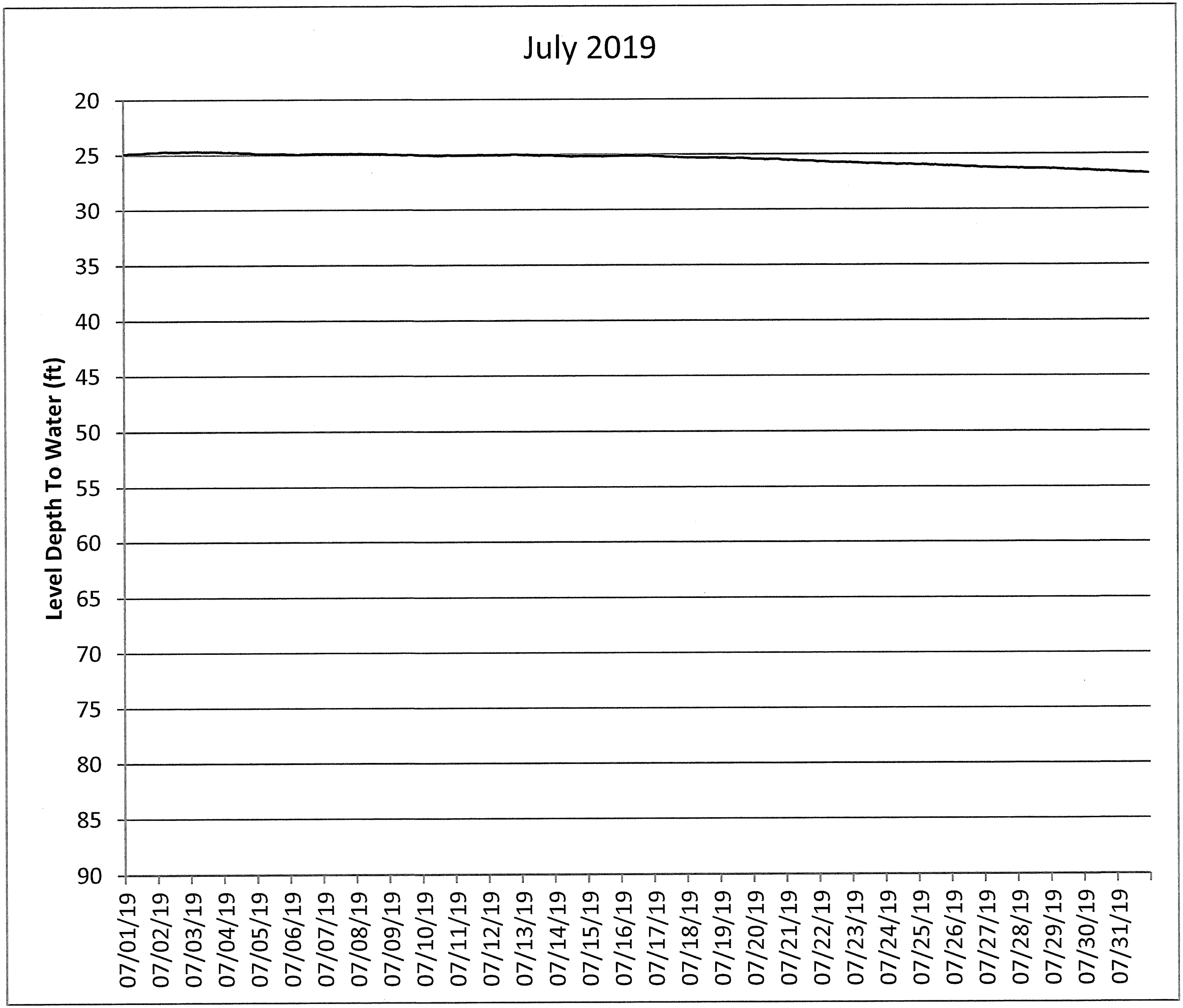

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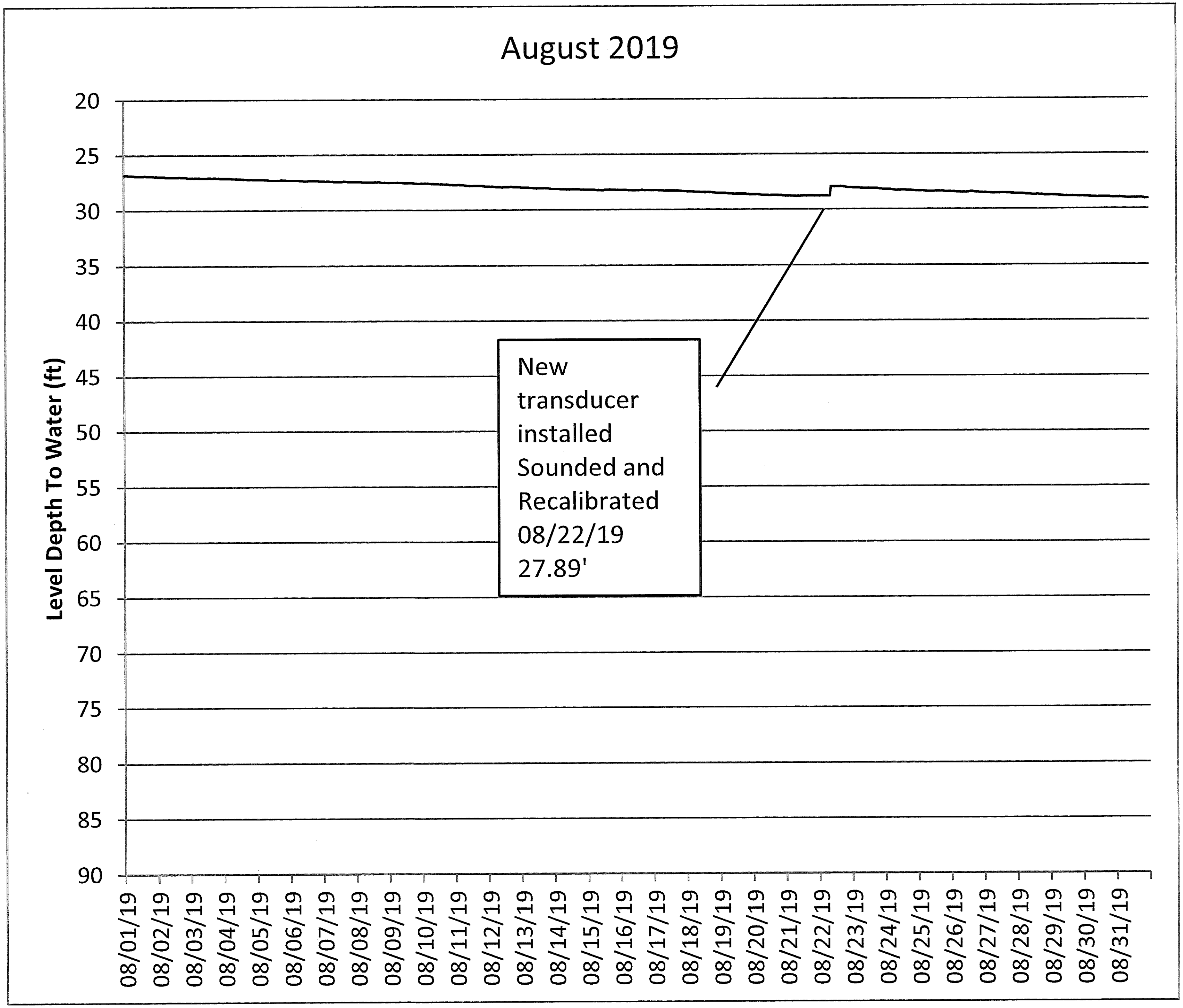

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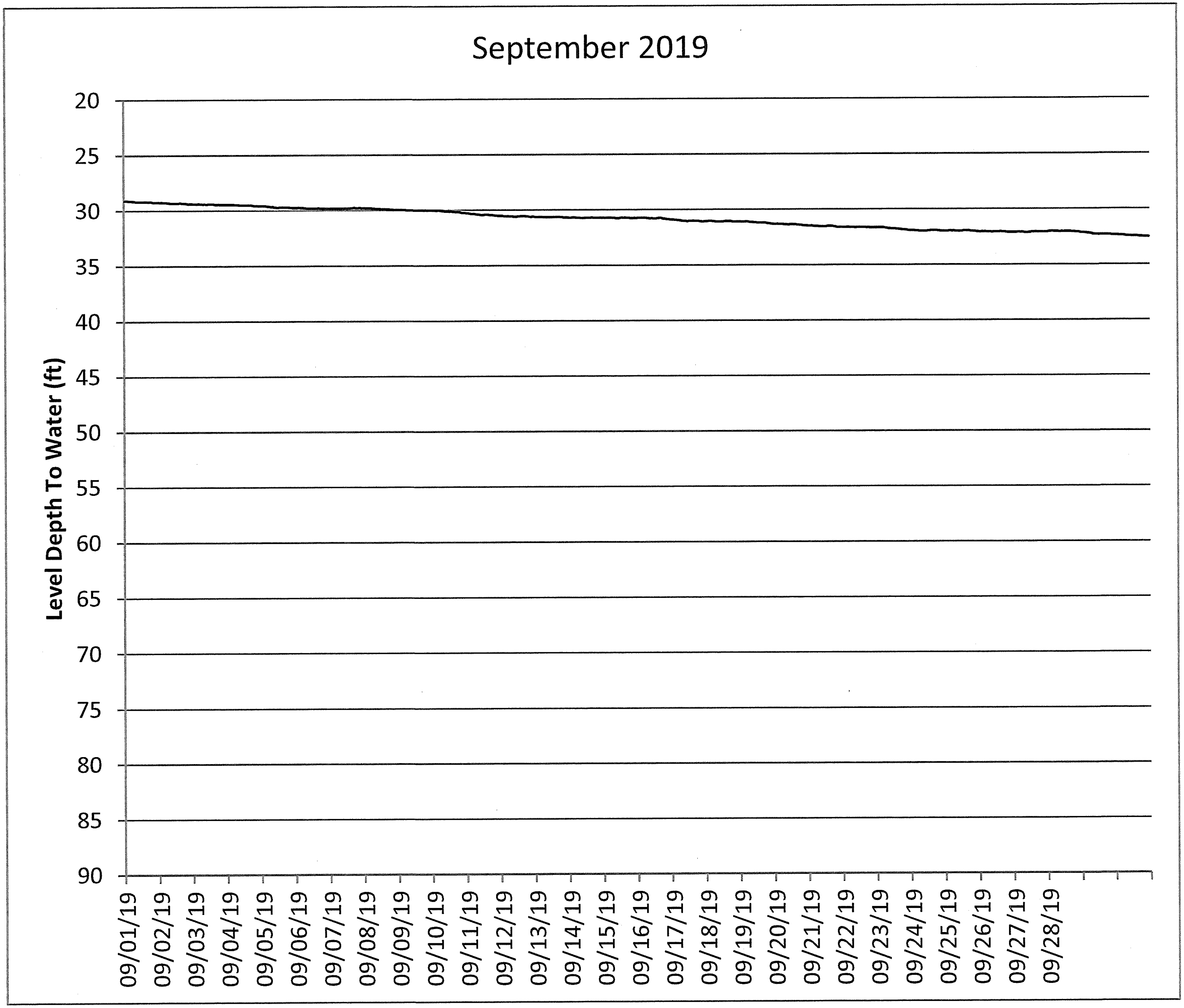

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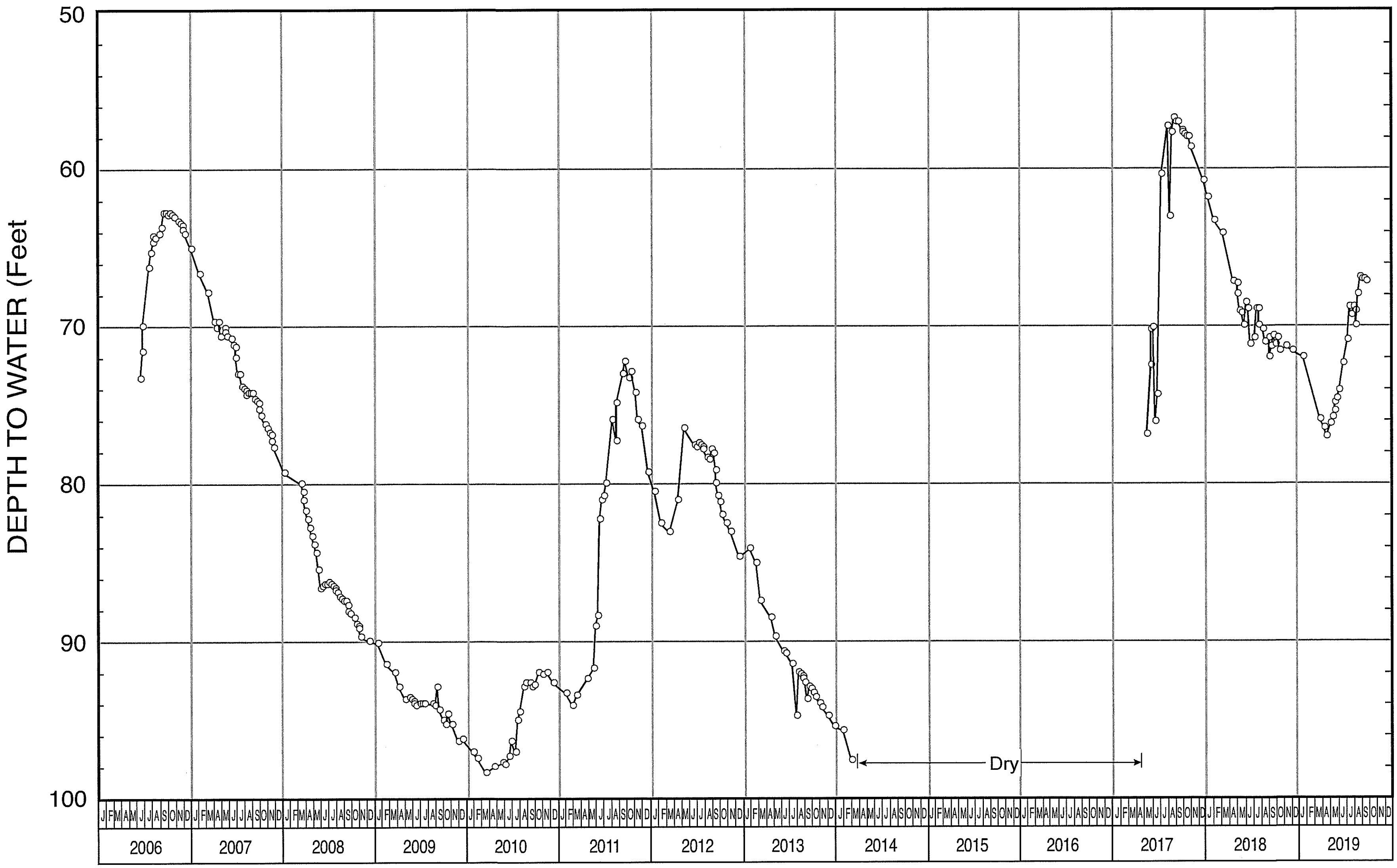
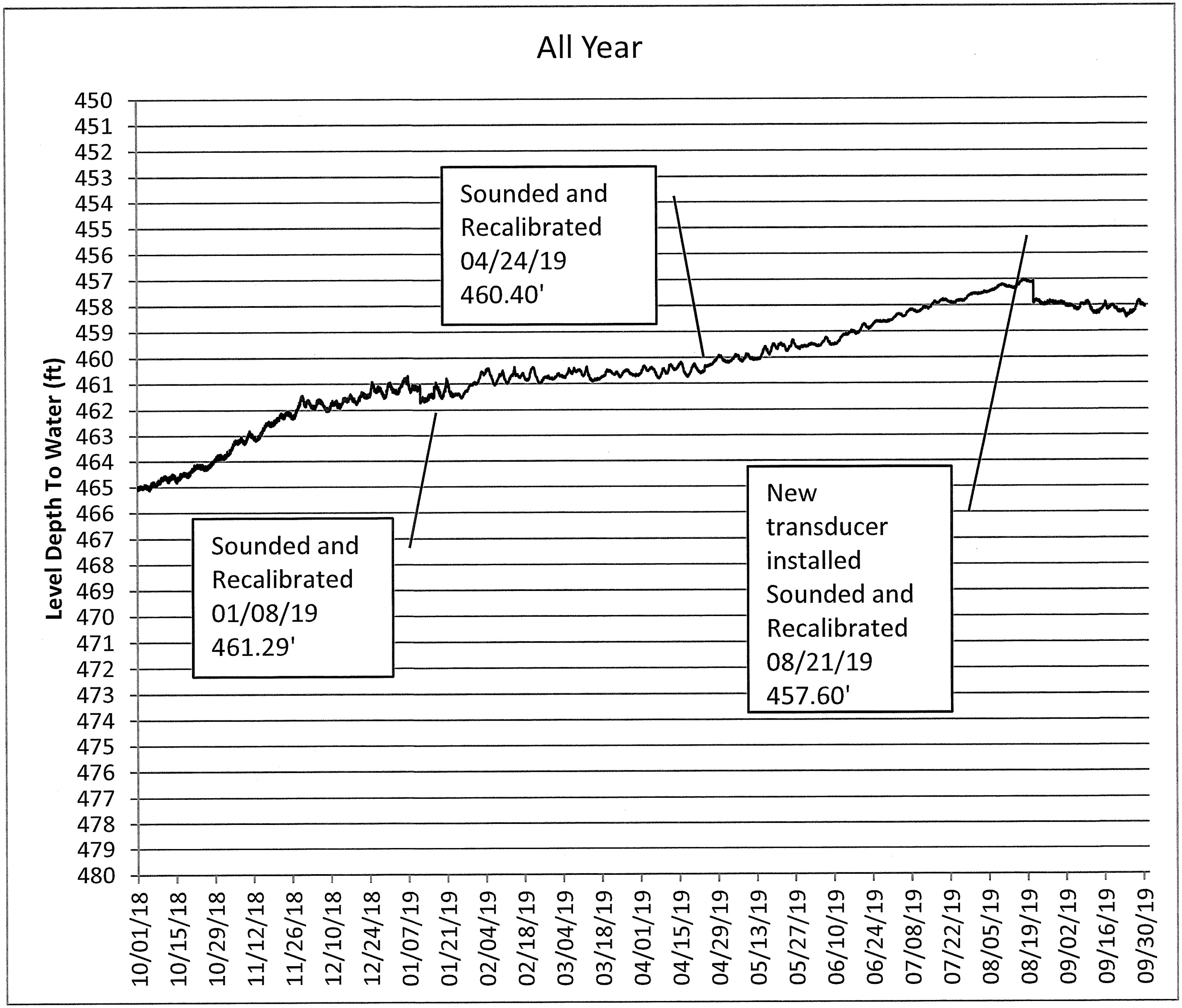
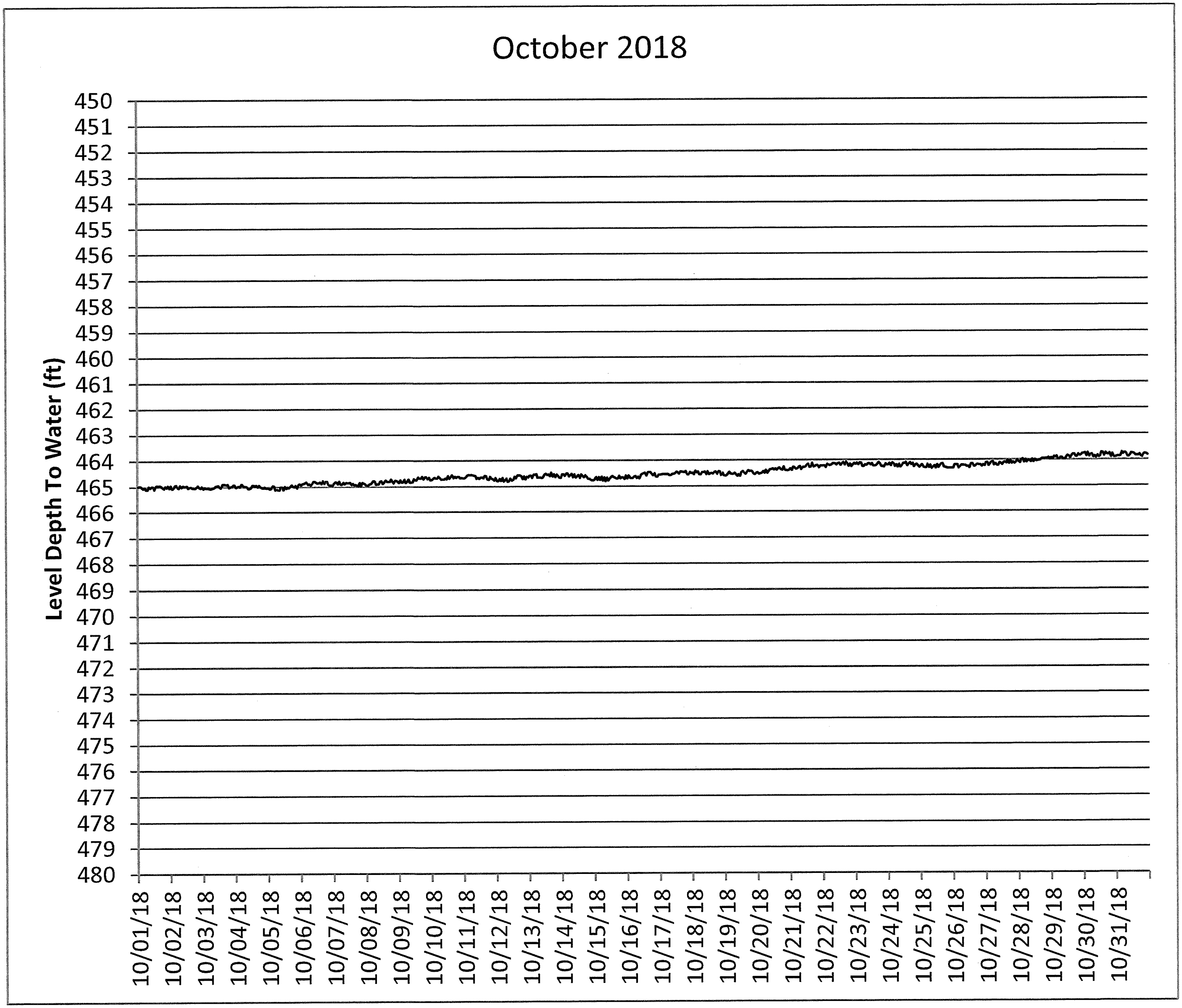


WATER-LEVEL HYDROGRAPH FOR WELL NO. 29



WATER LEVEL HYDROGRAPH FOR MW-30M



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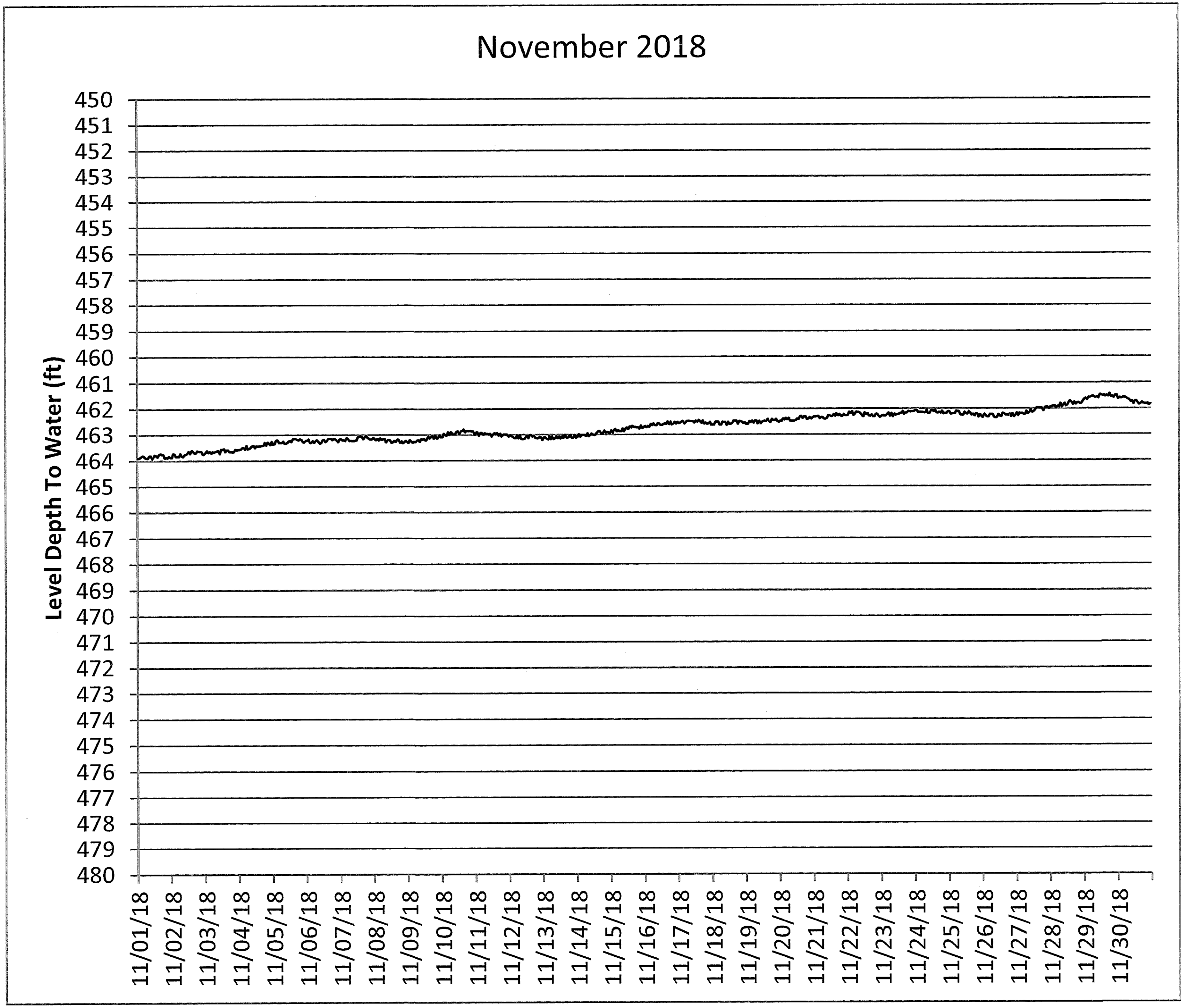

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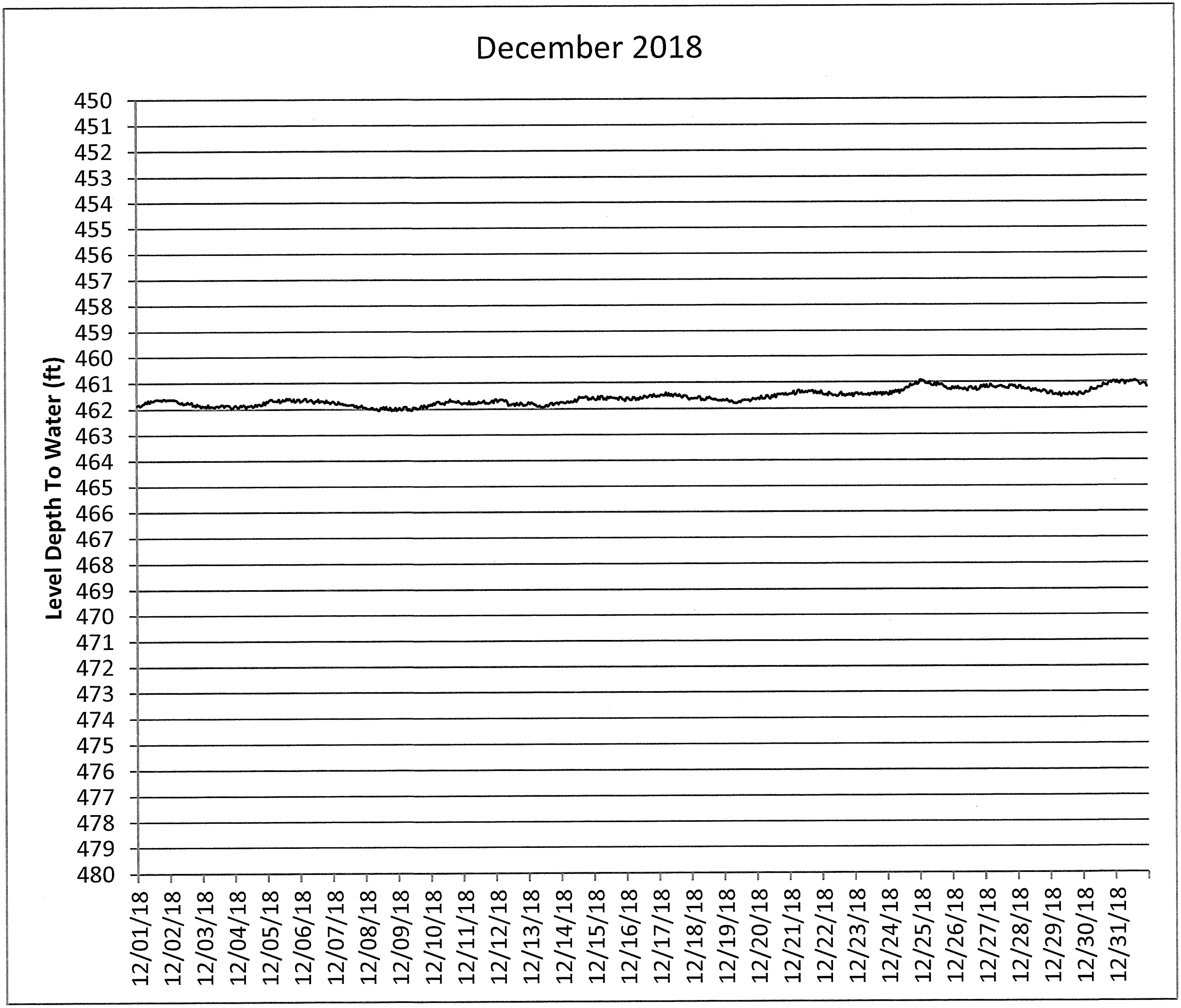

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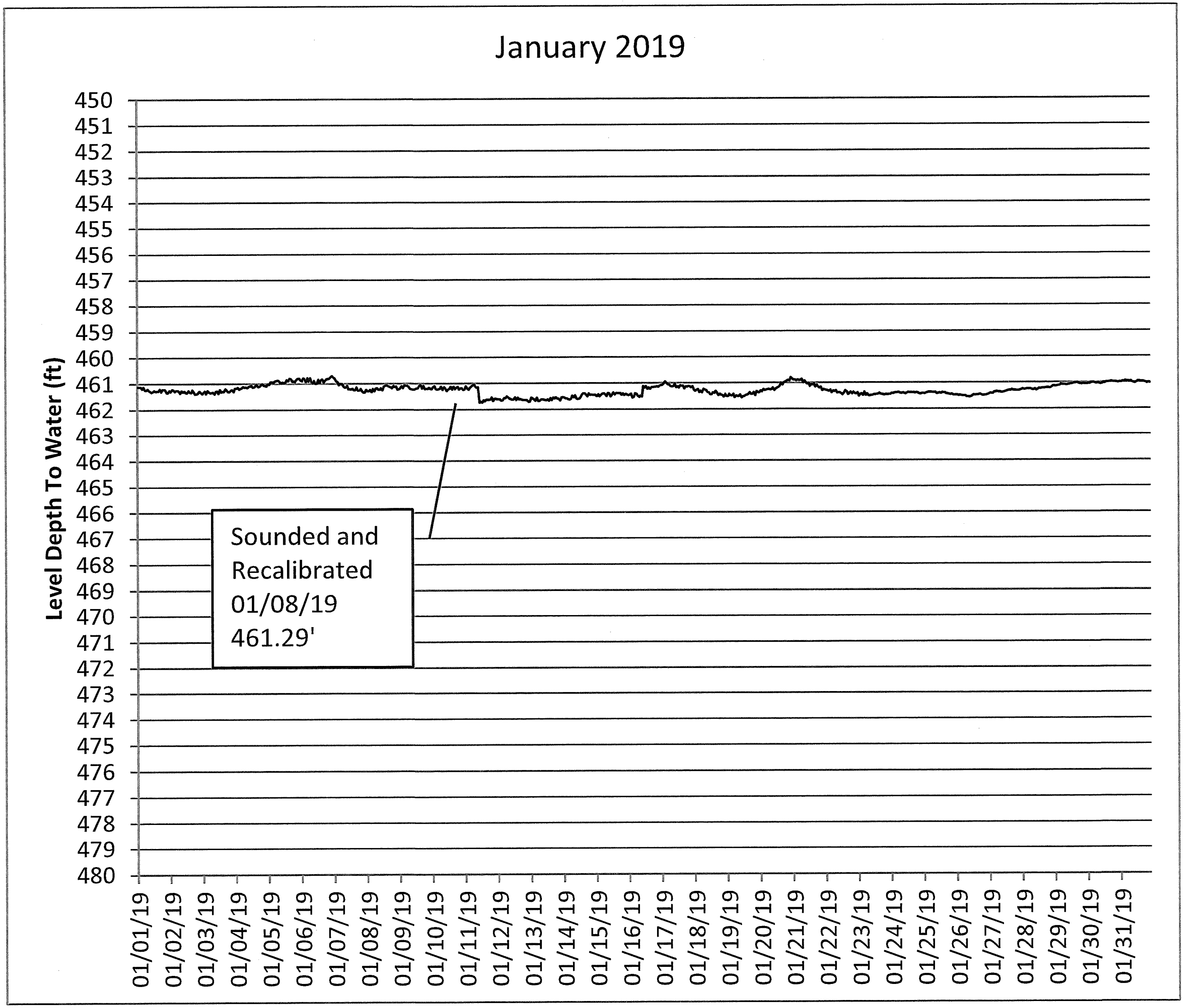

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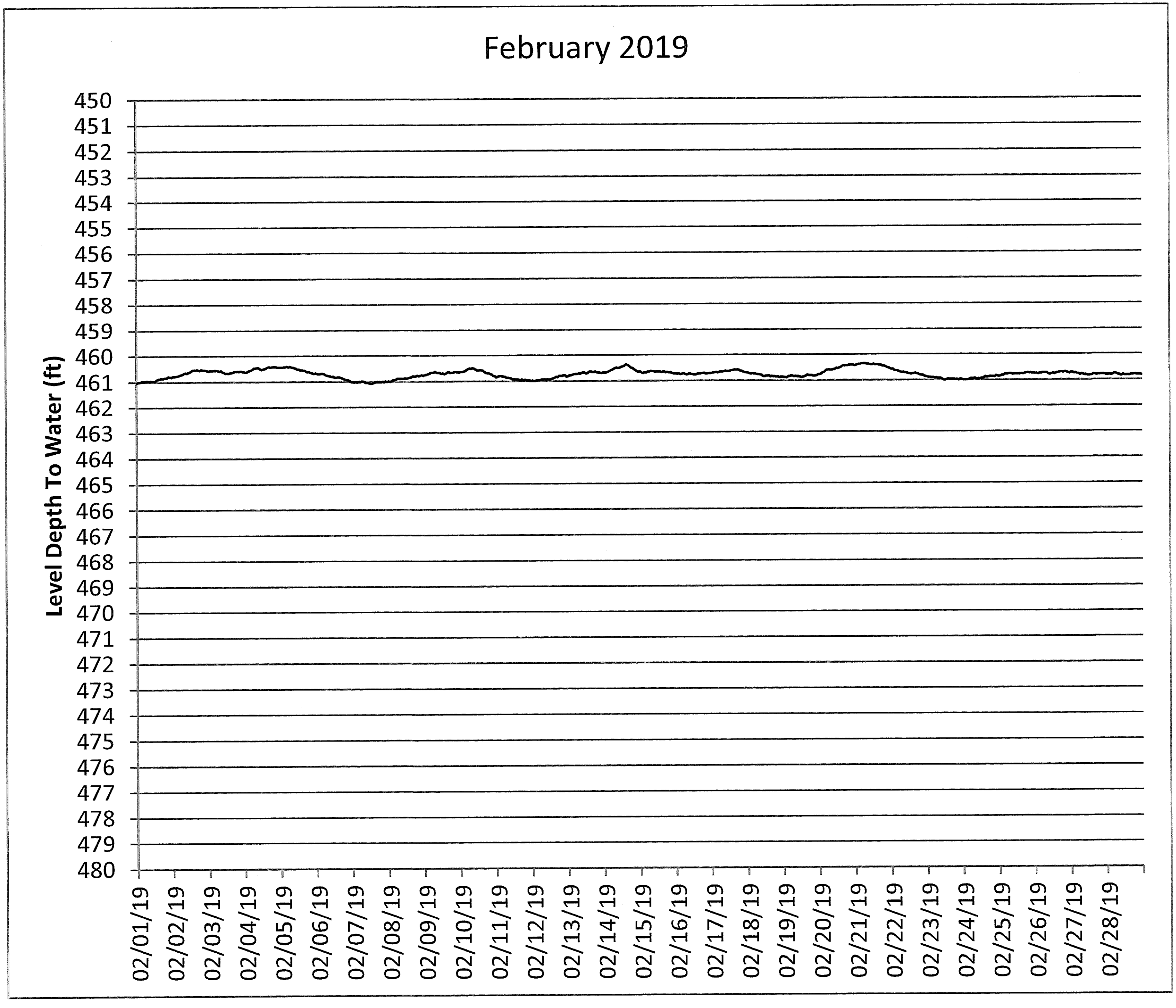

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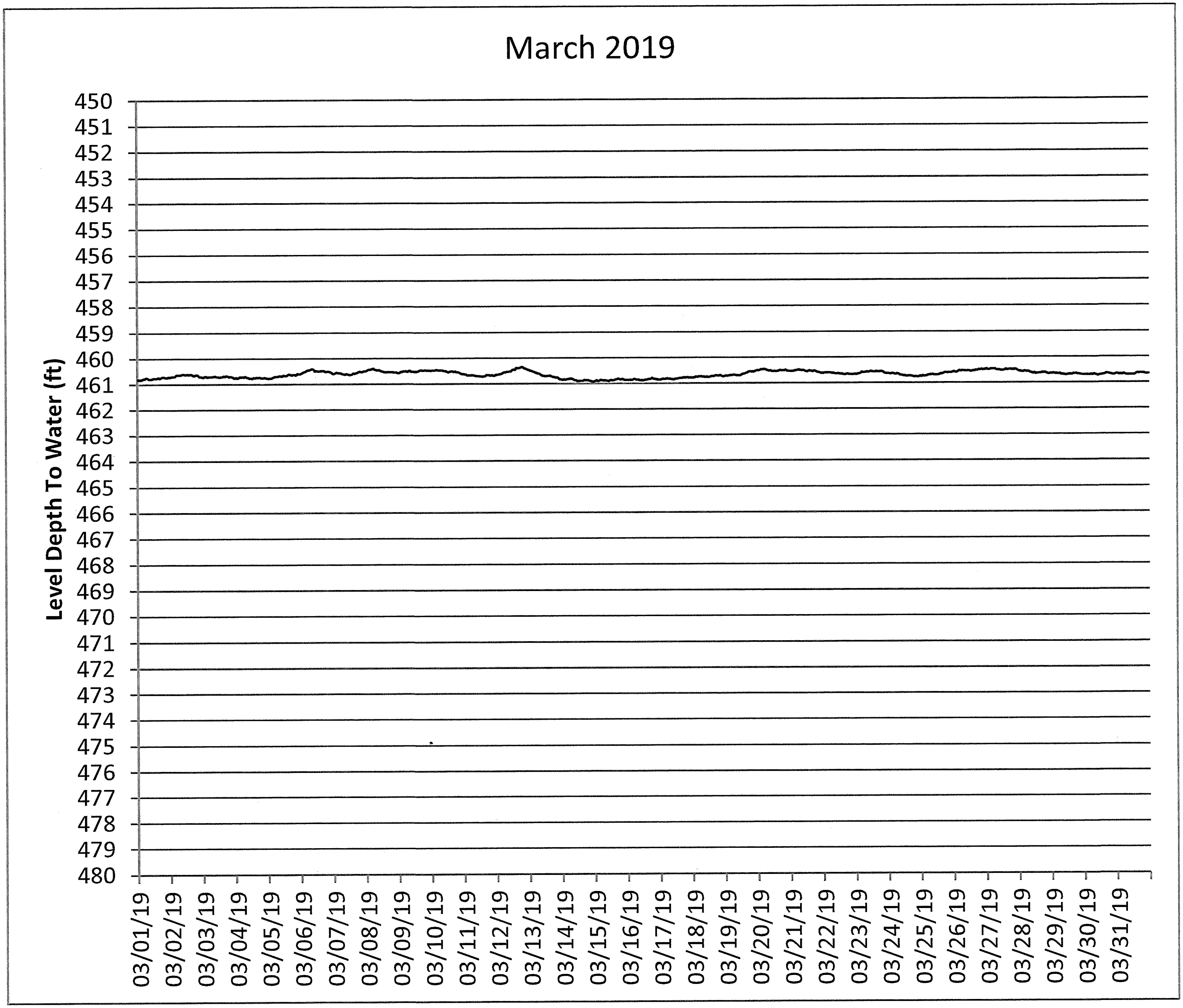

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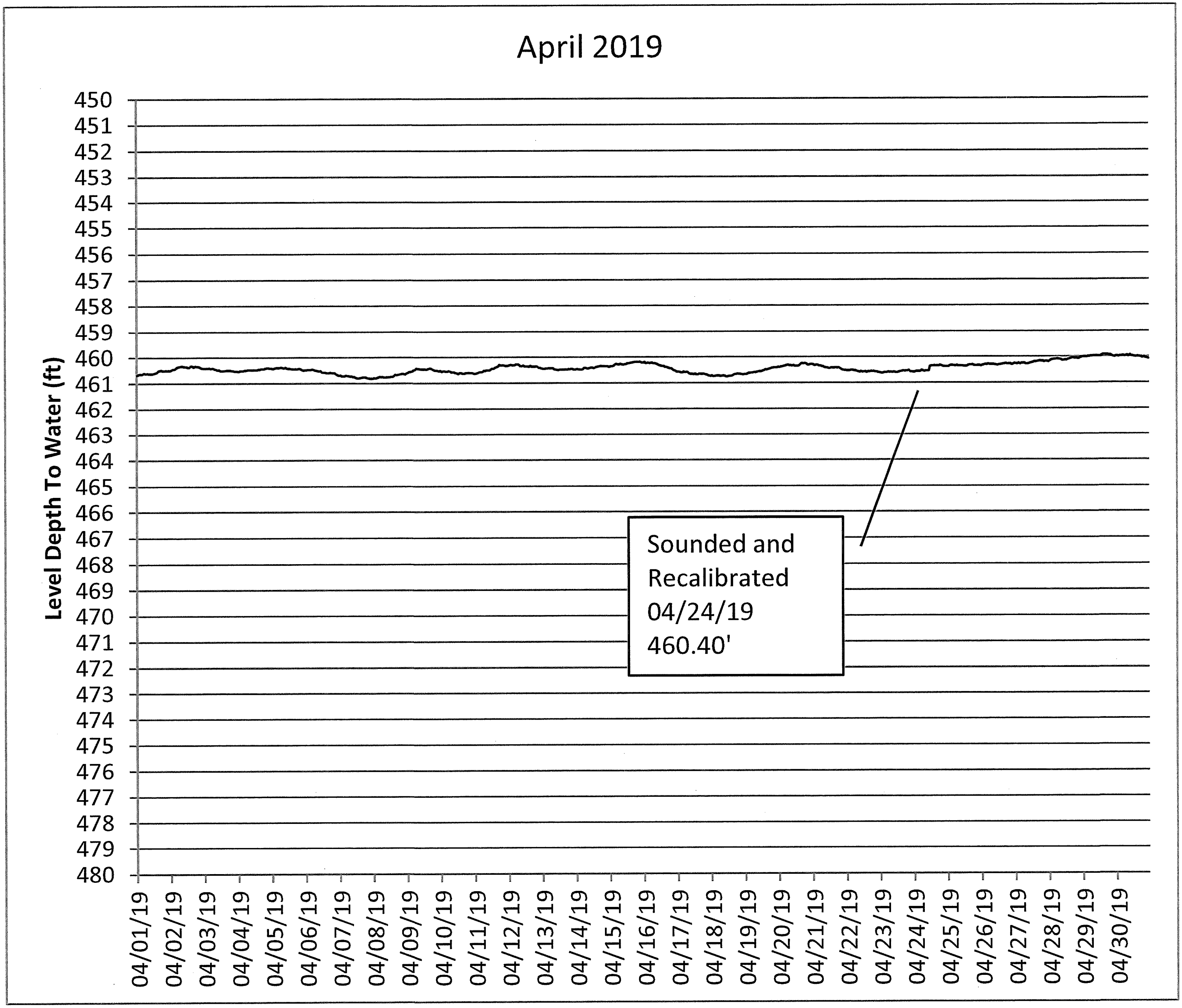

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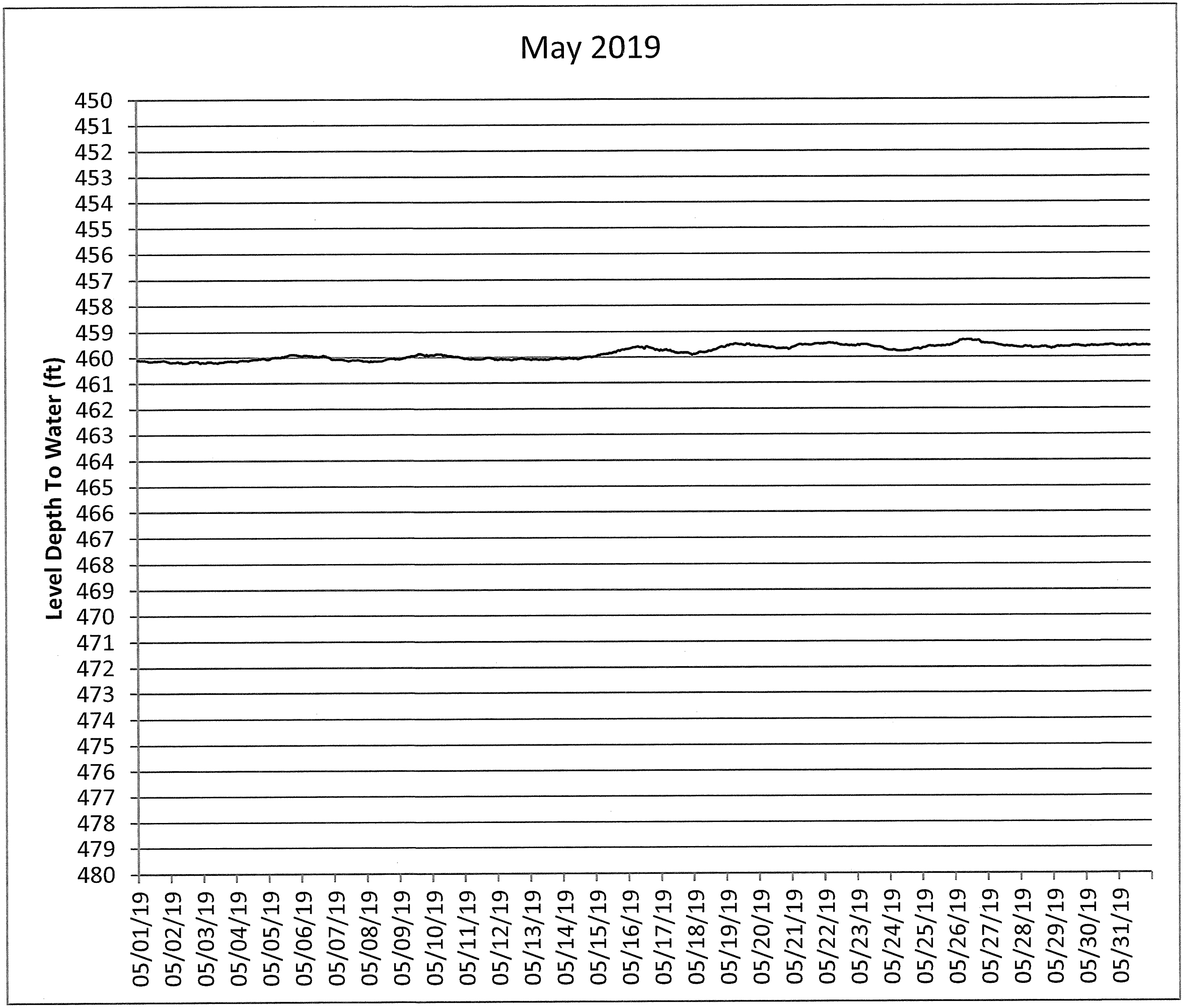

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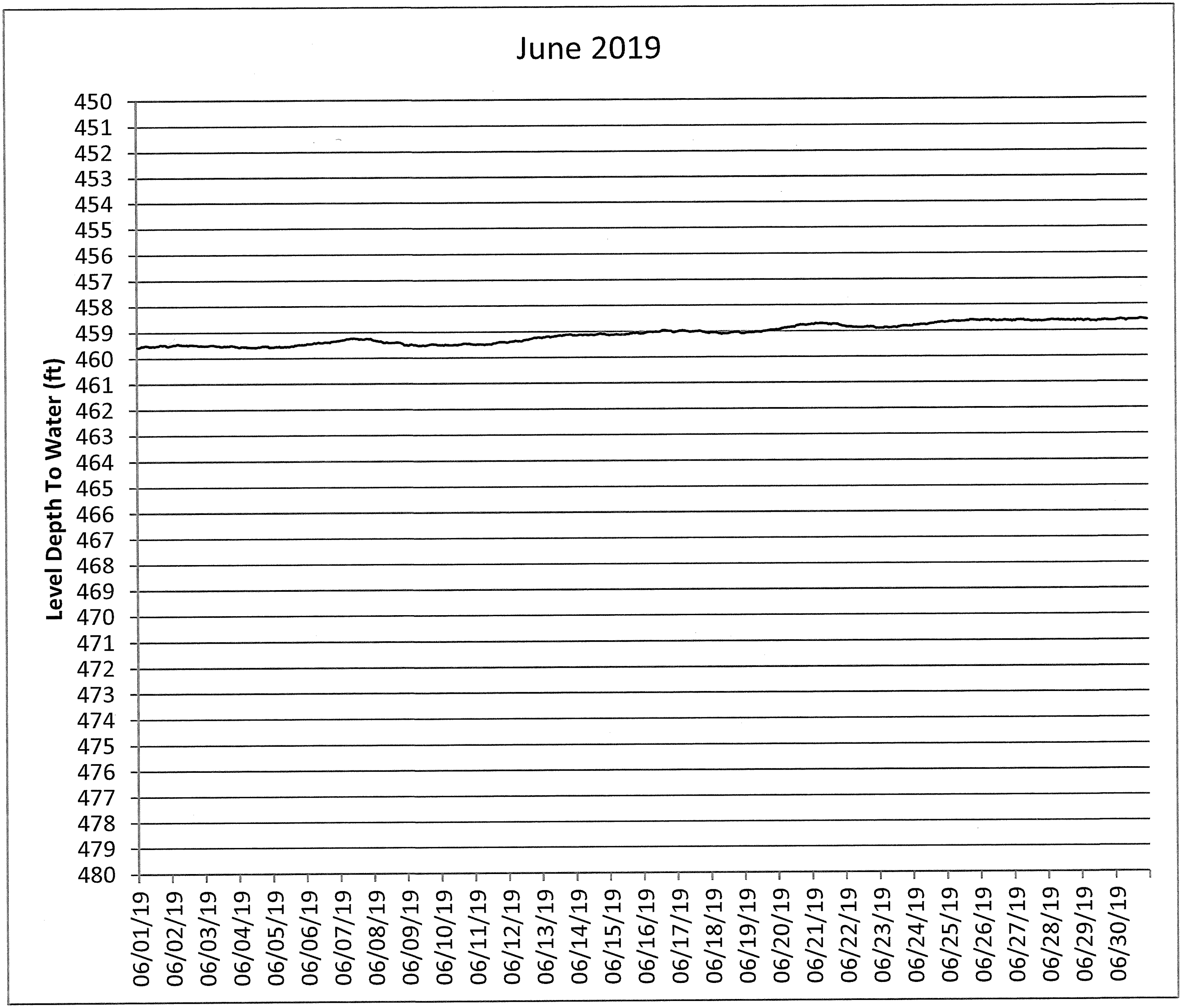

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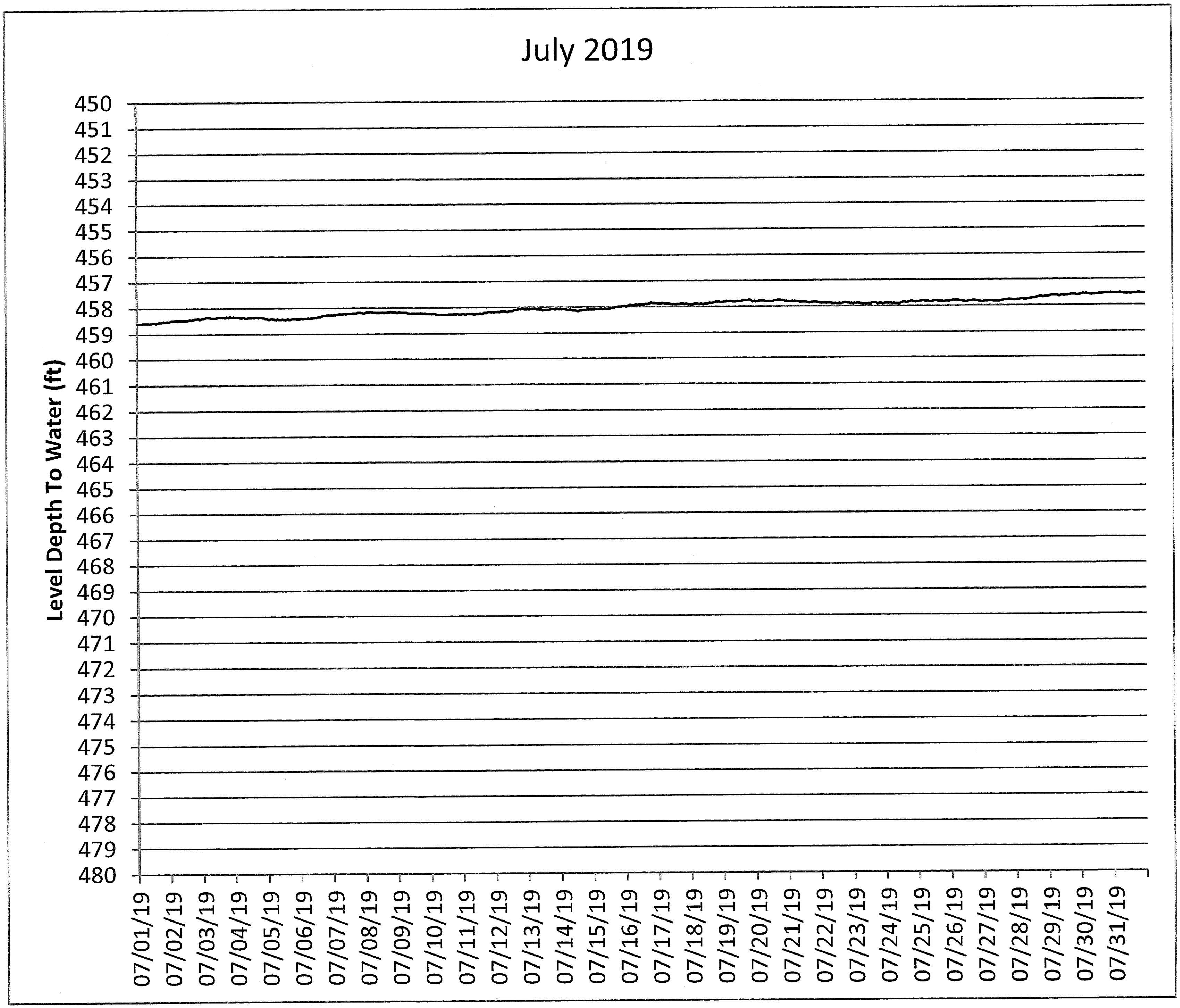

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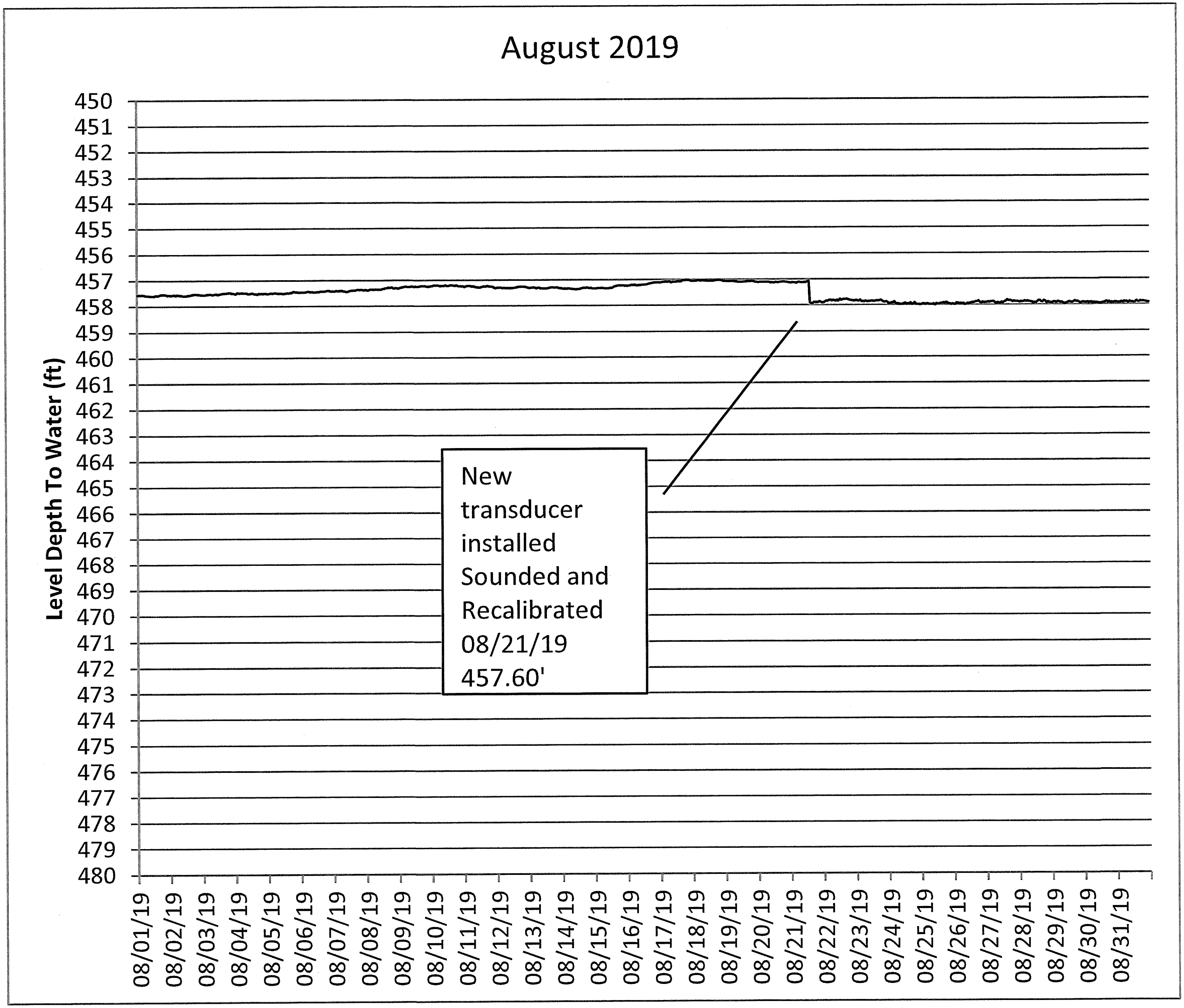

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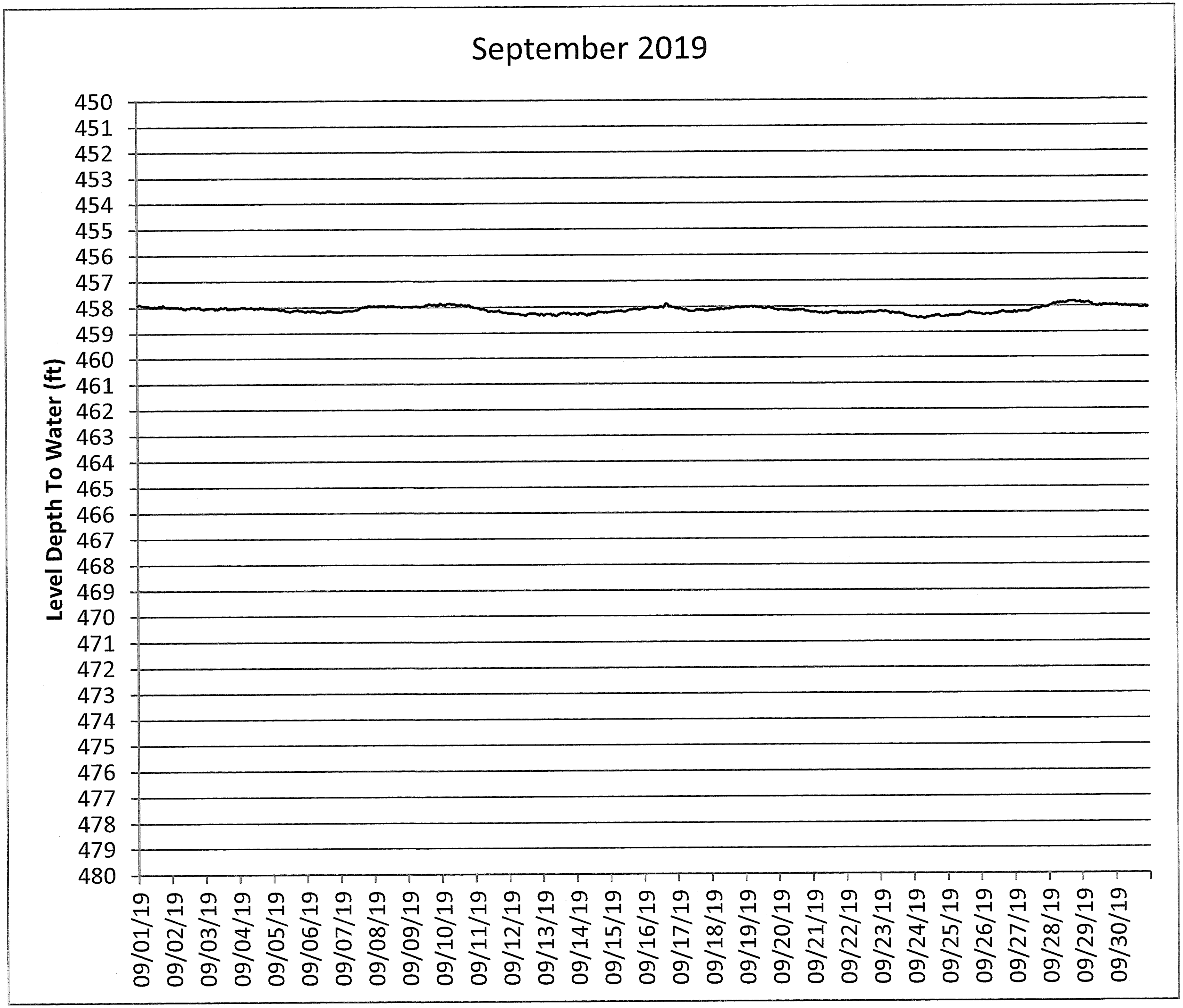

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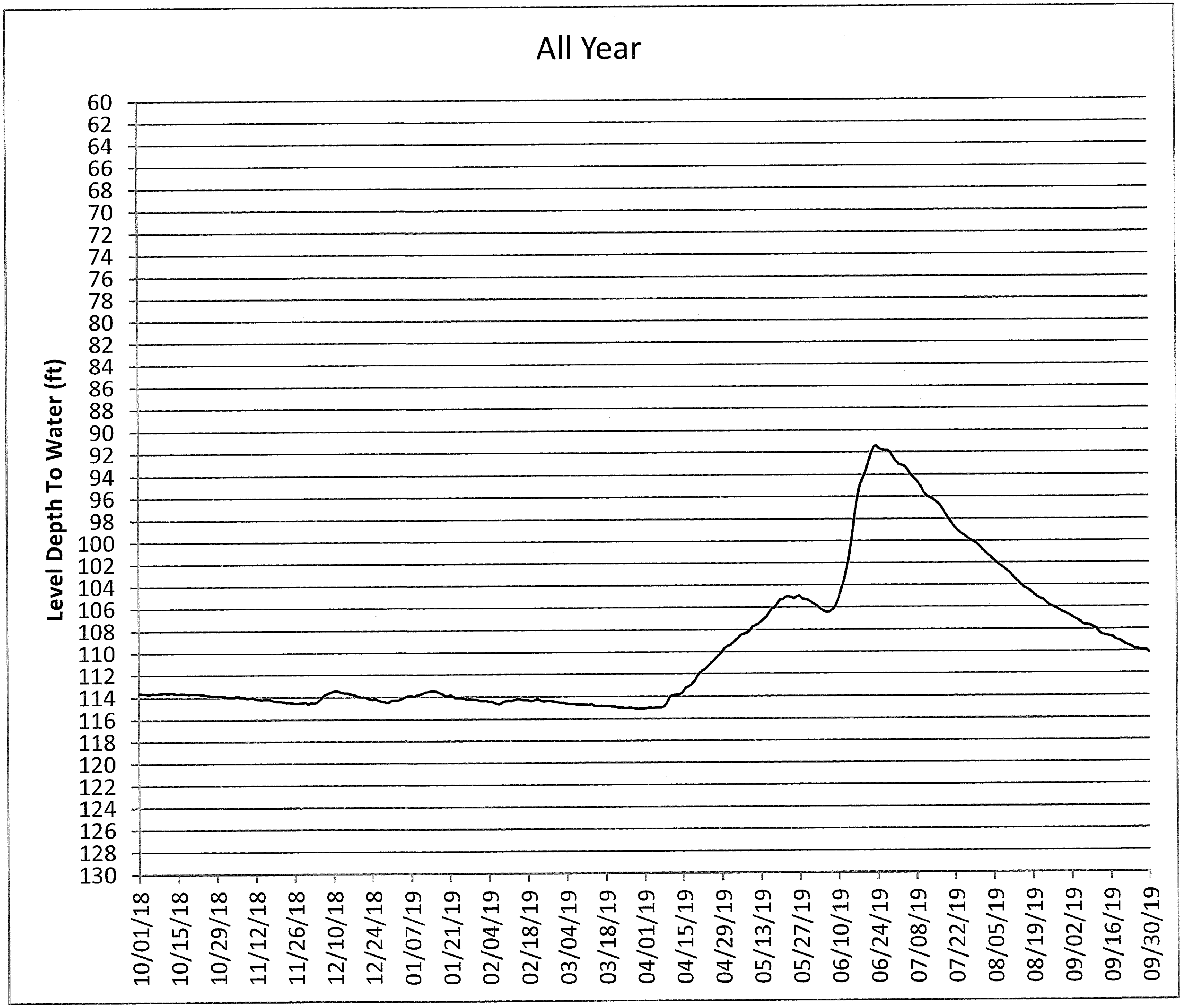
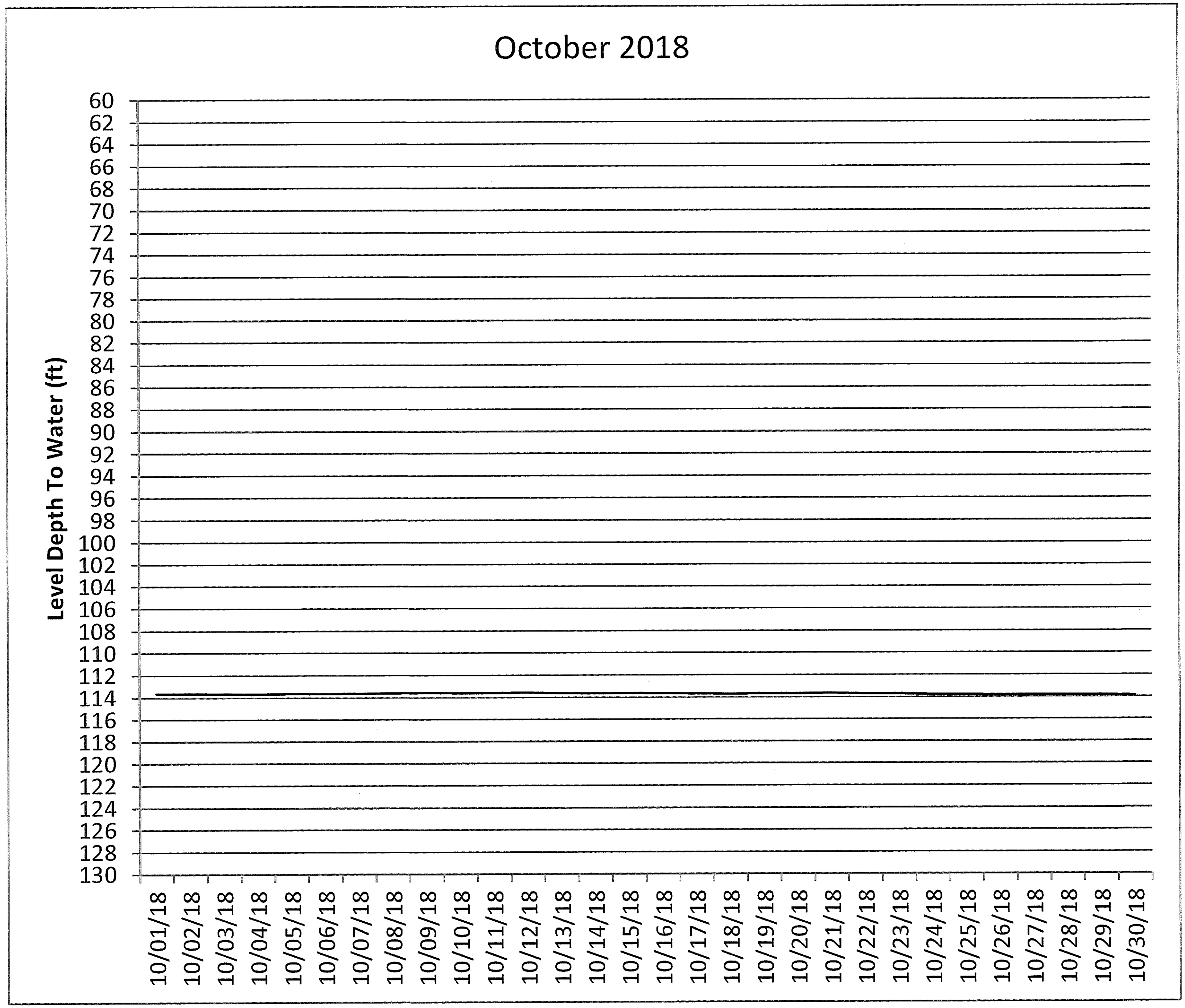


WATER LEVEL HYDROGRAPH FOR MW-SC-1



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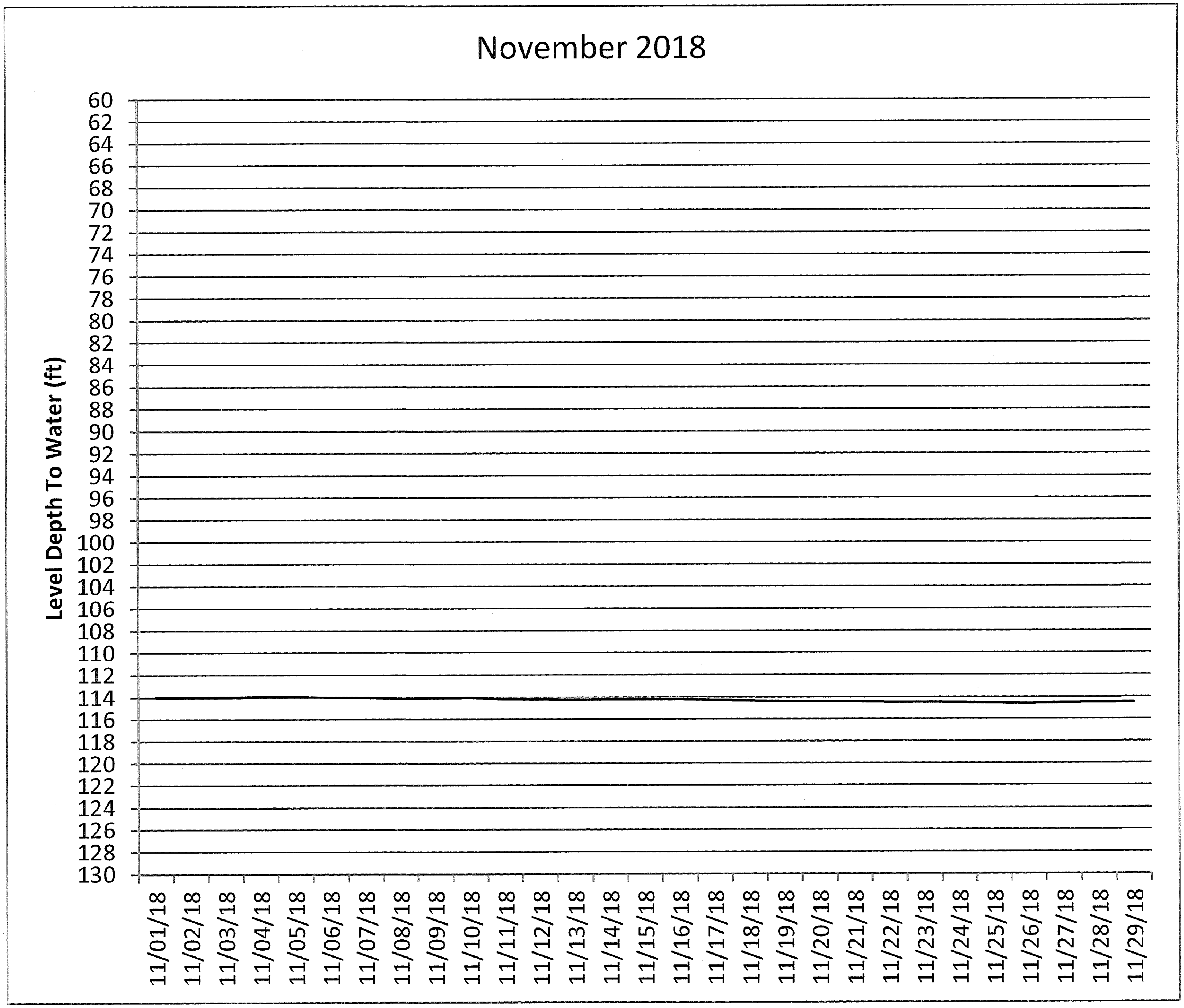

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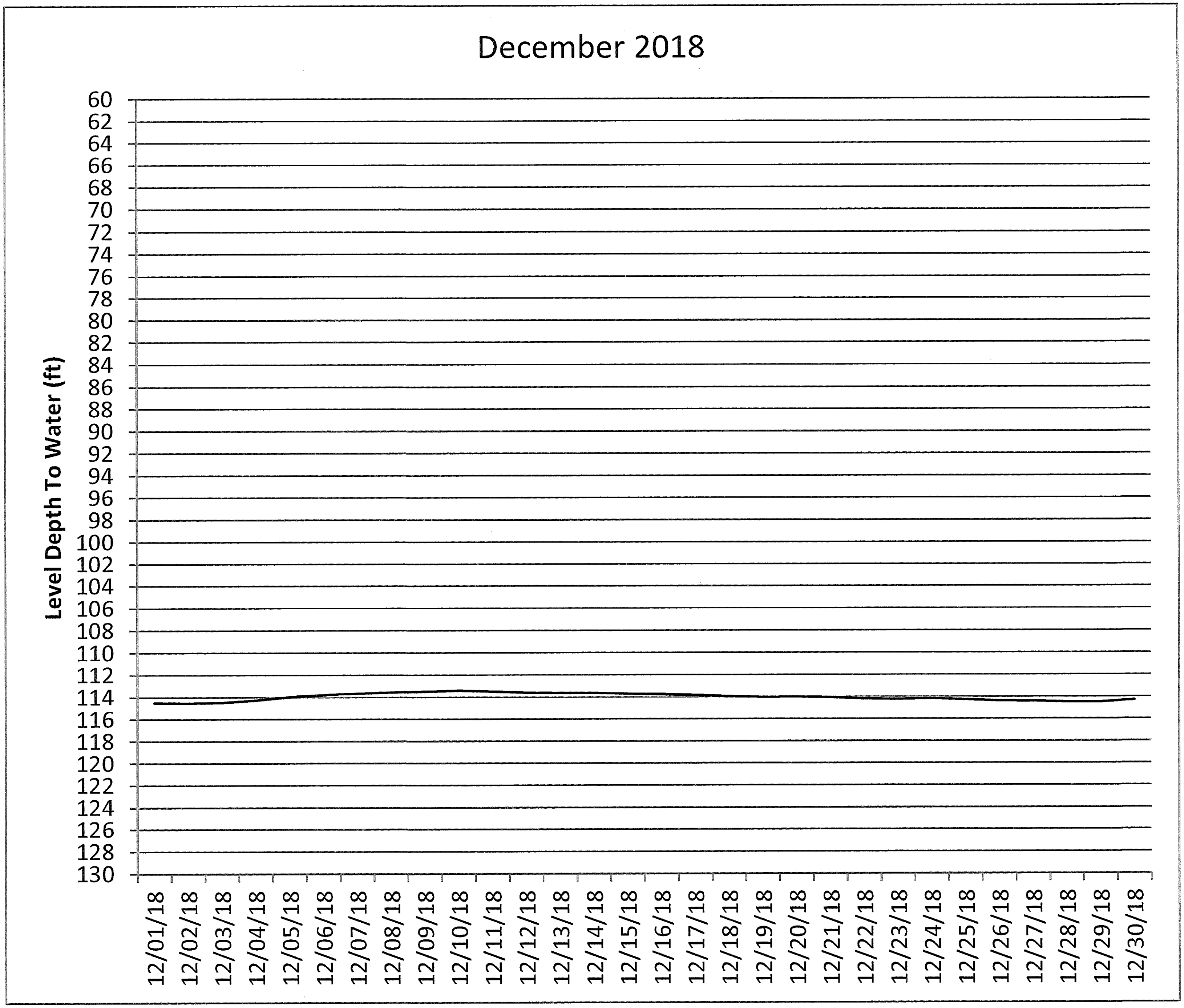

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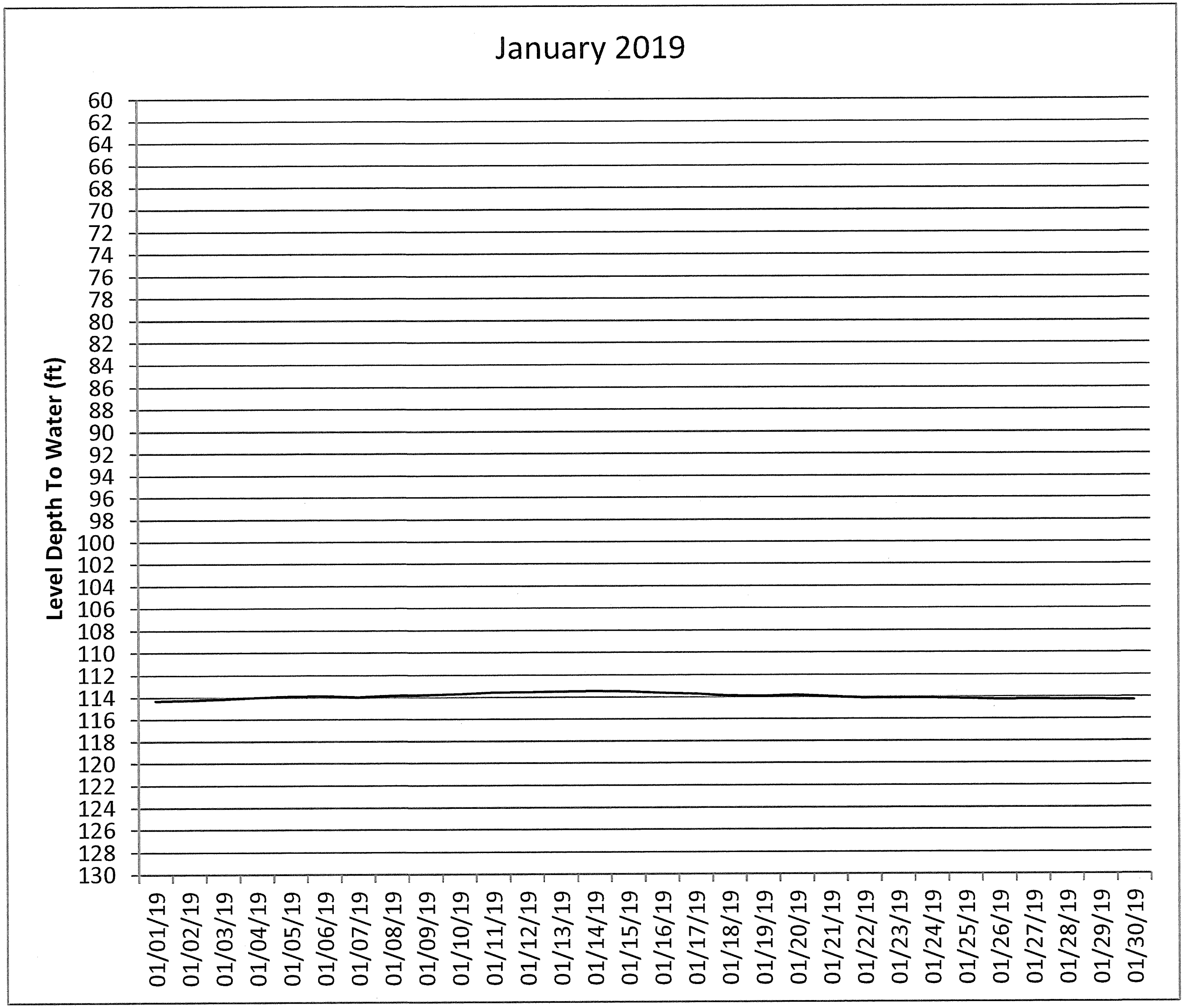

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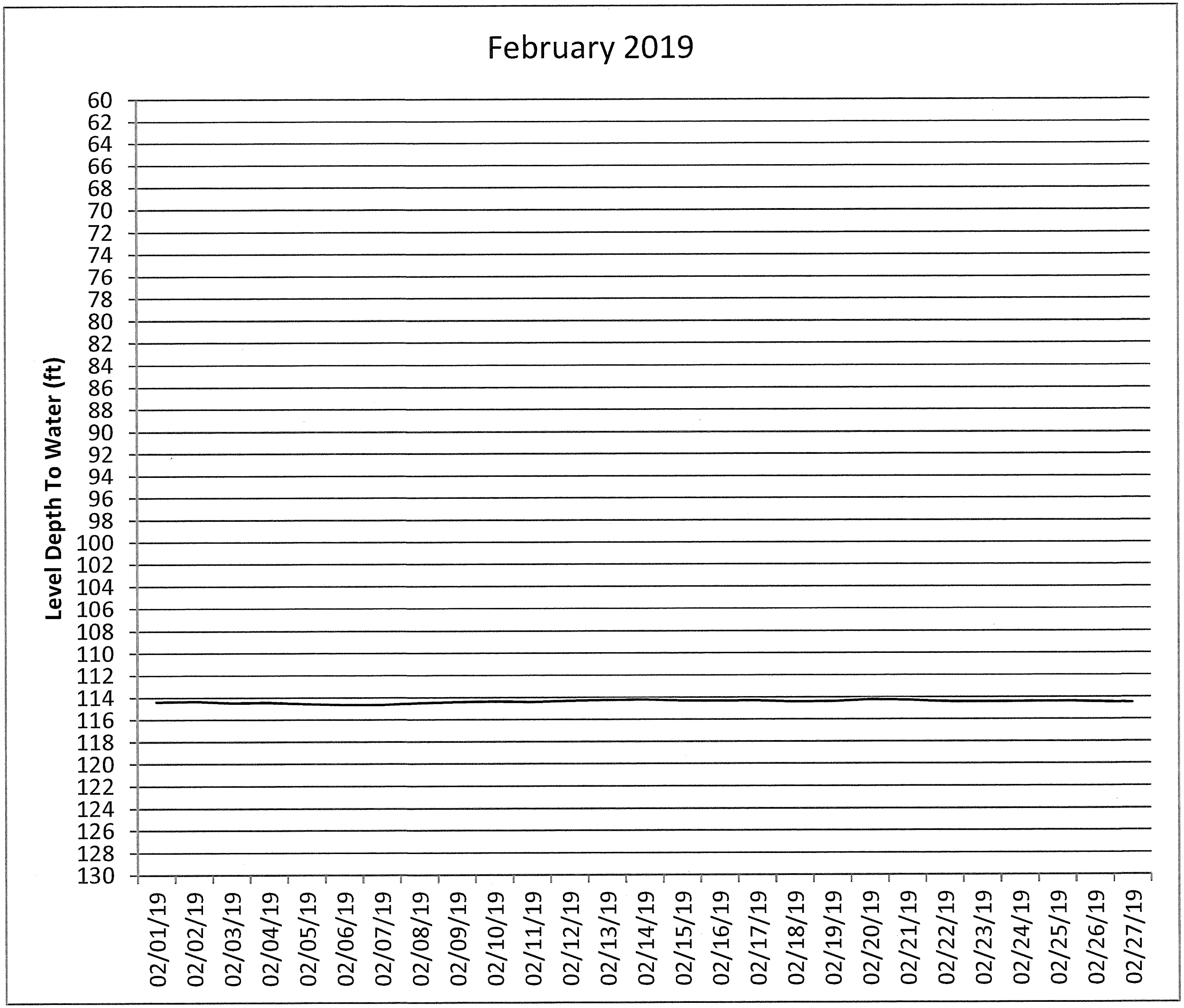

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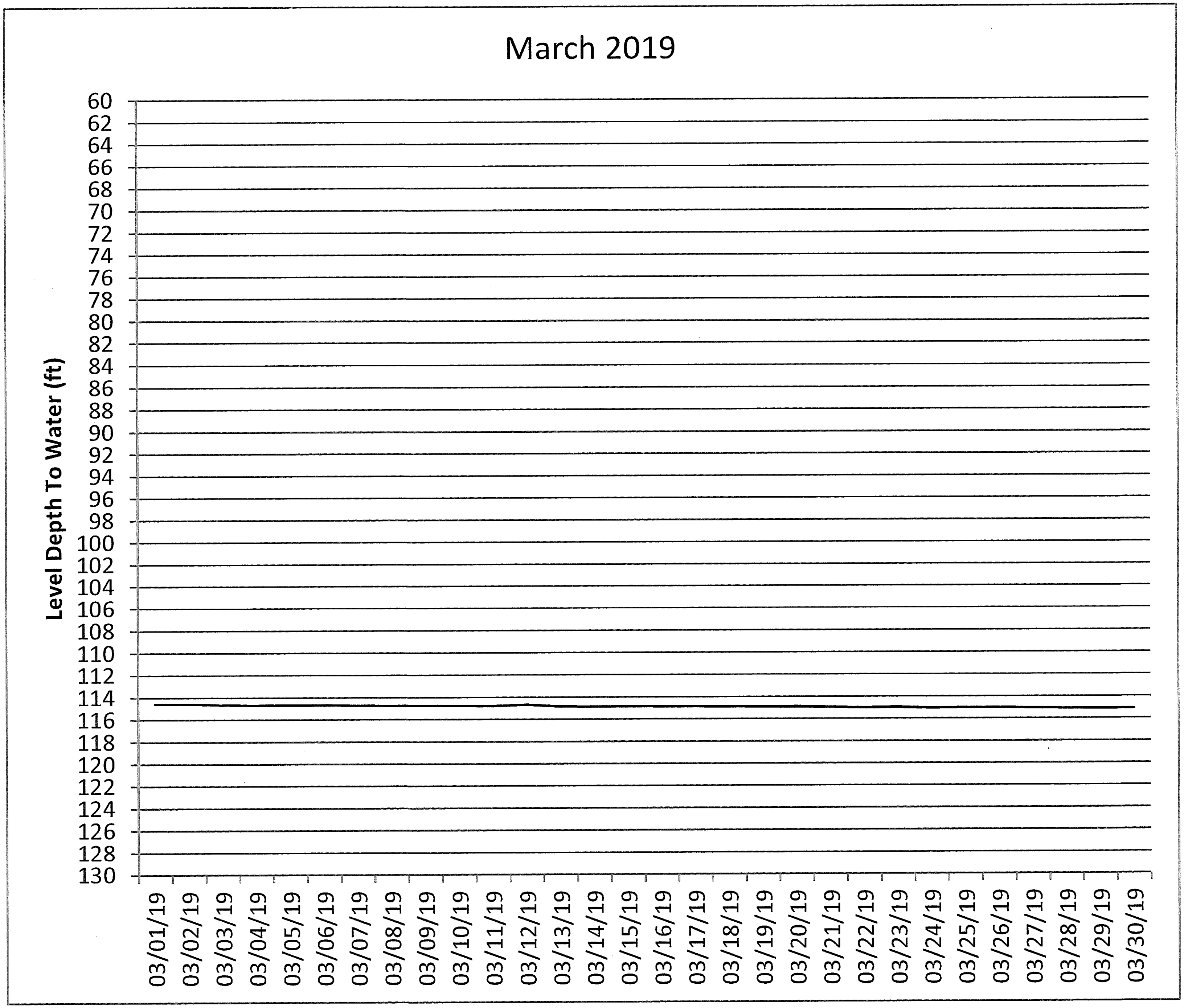
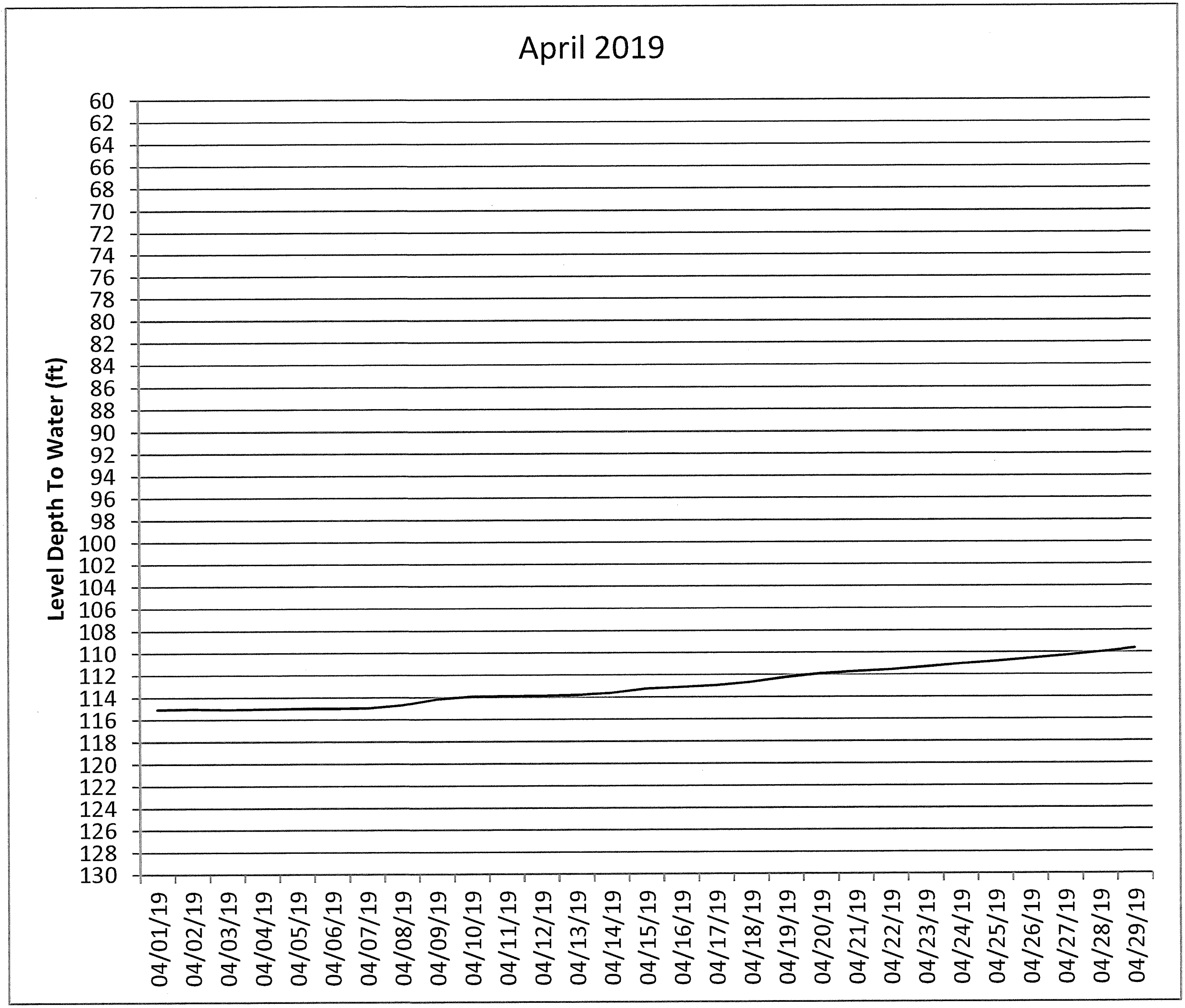


WATER LEVEL HYDROGRAPH FOR MW-SC-1



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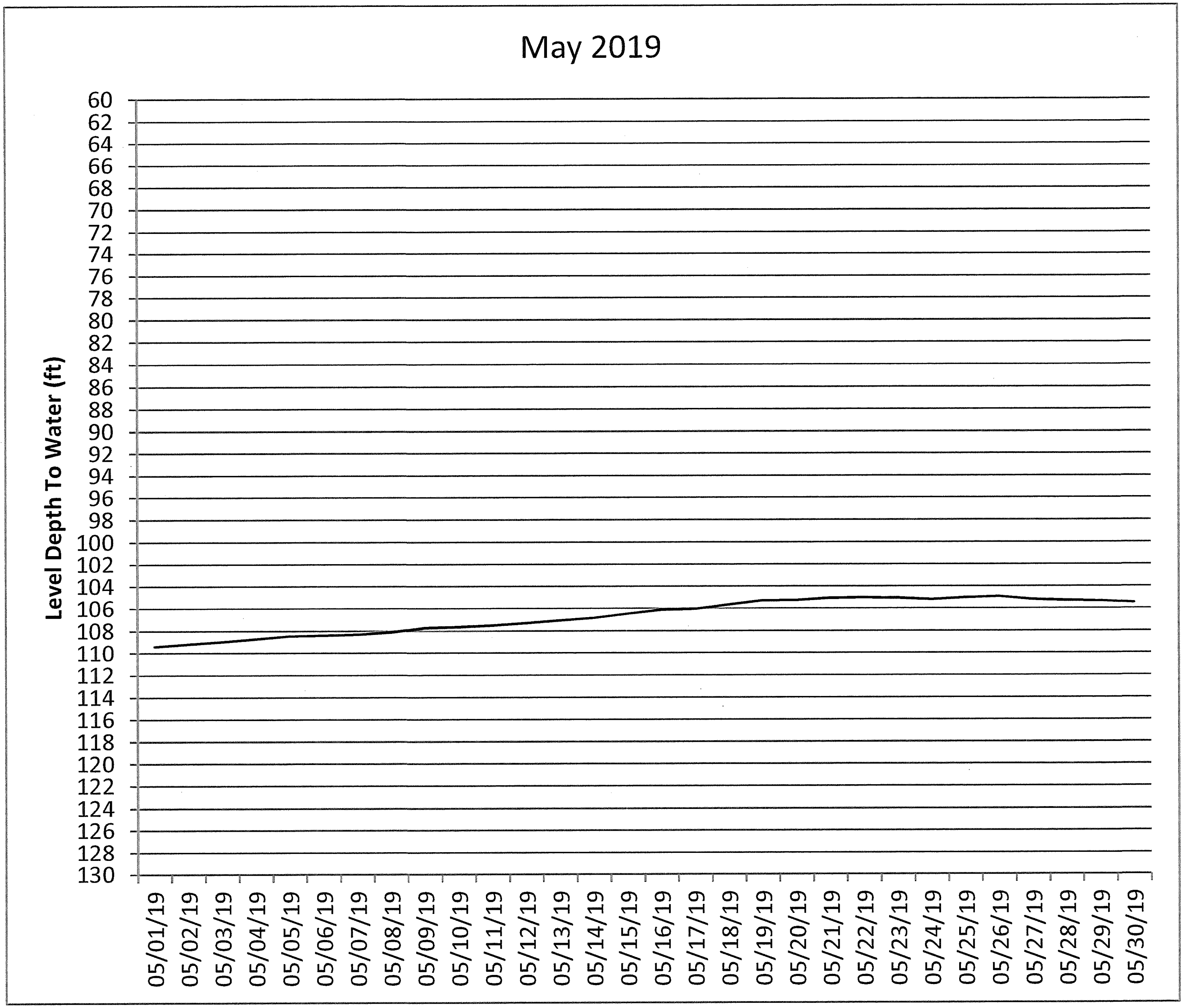

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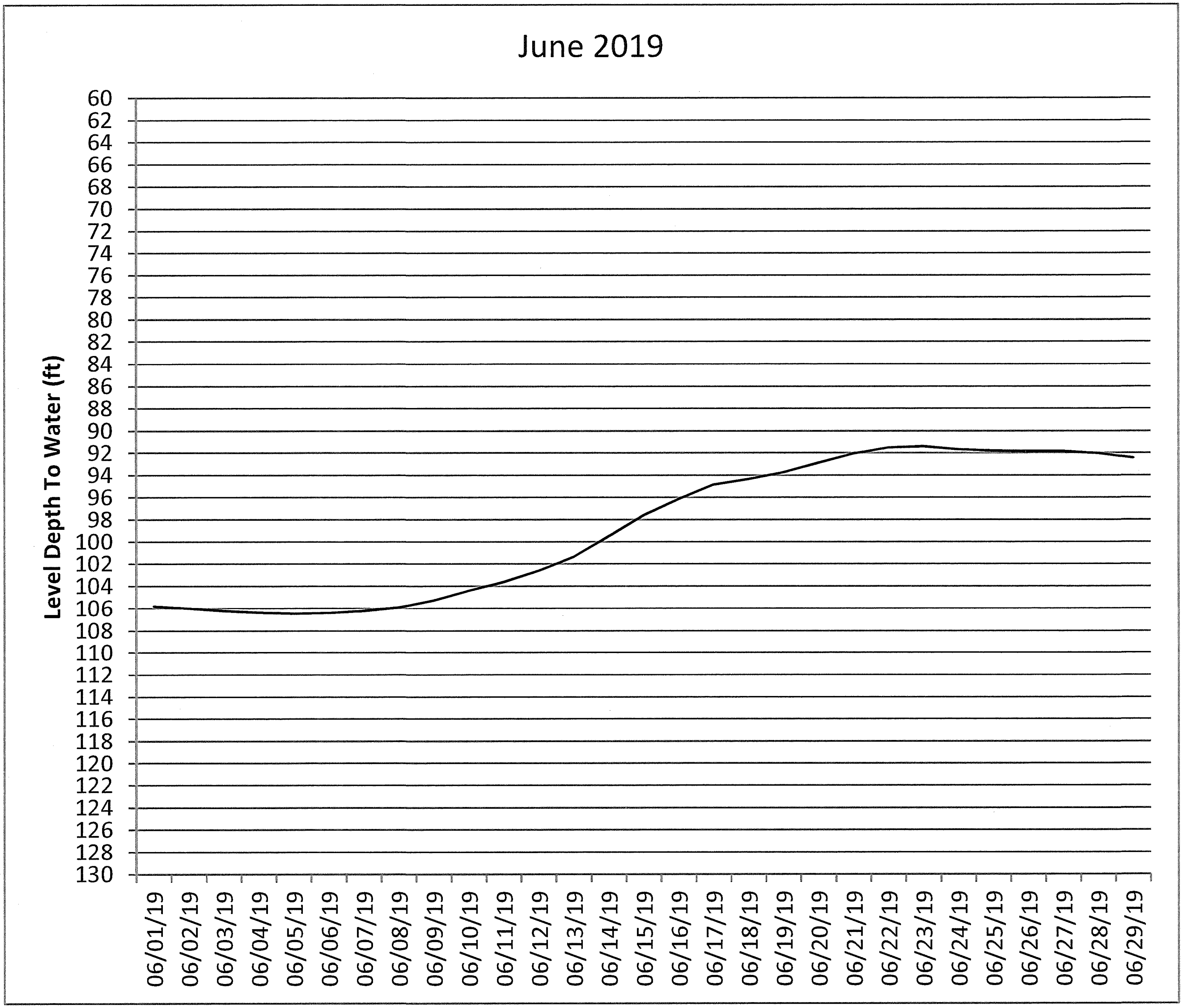

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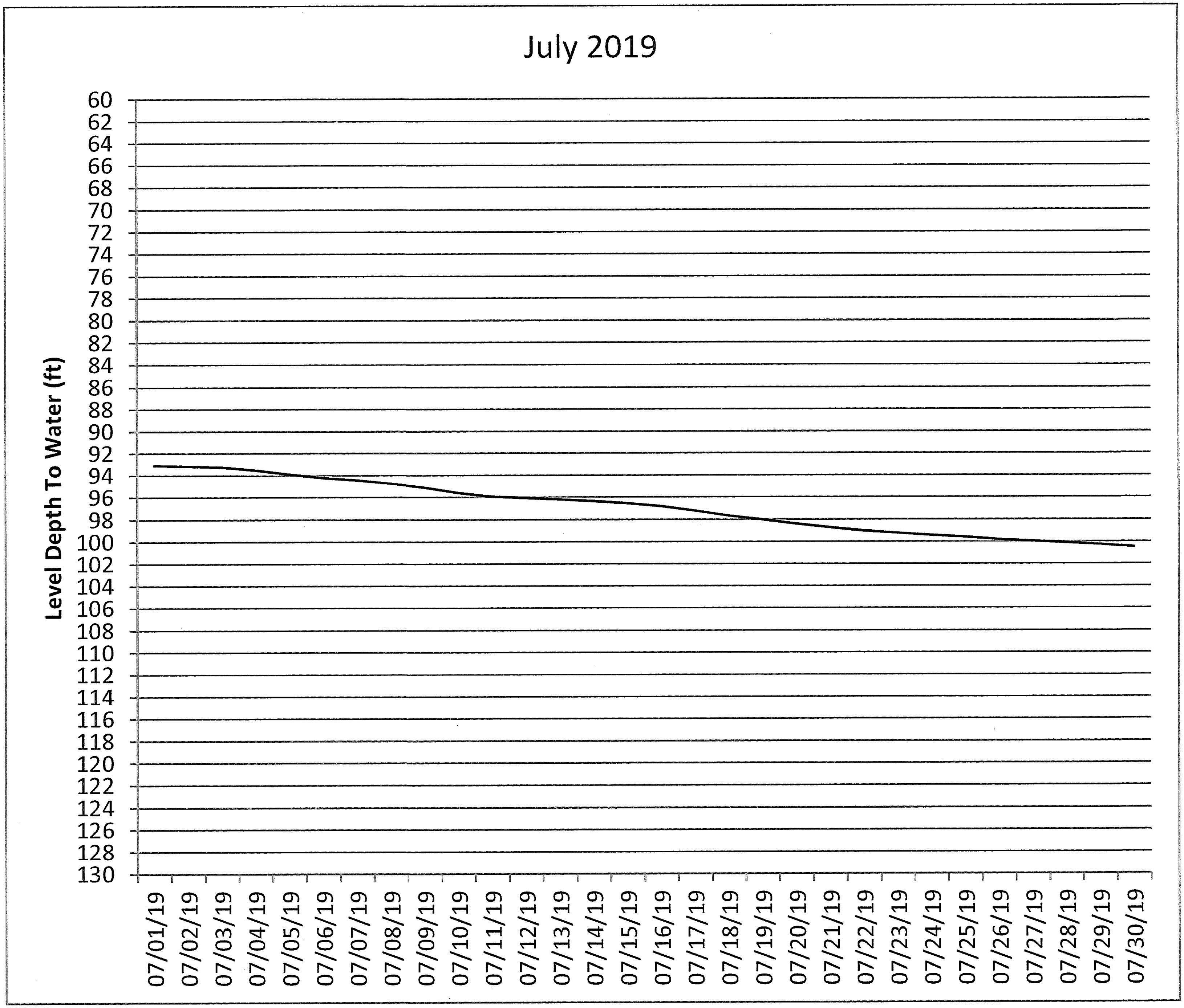

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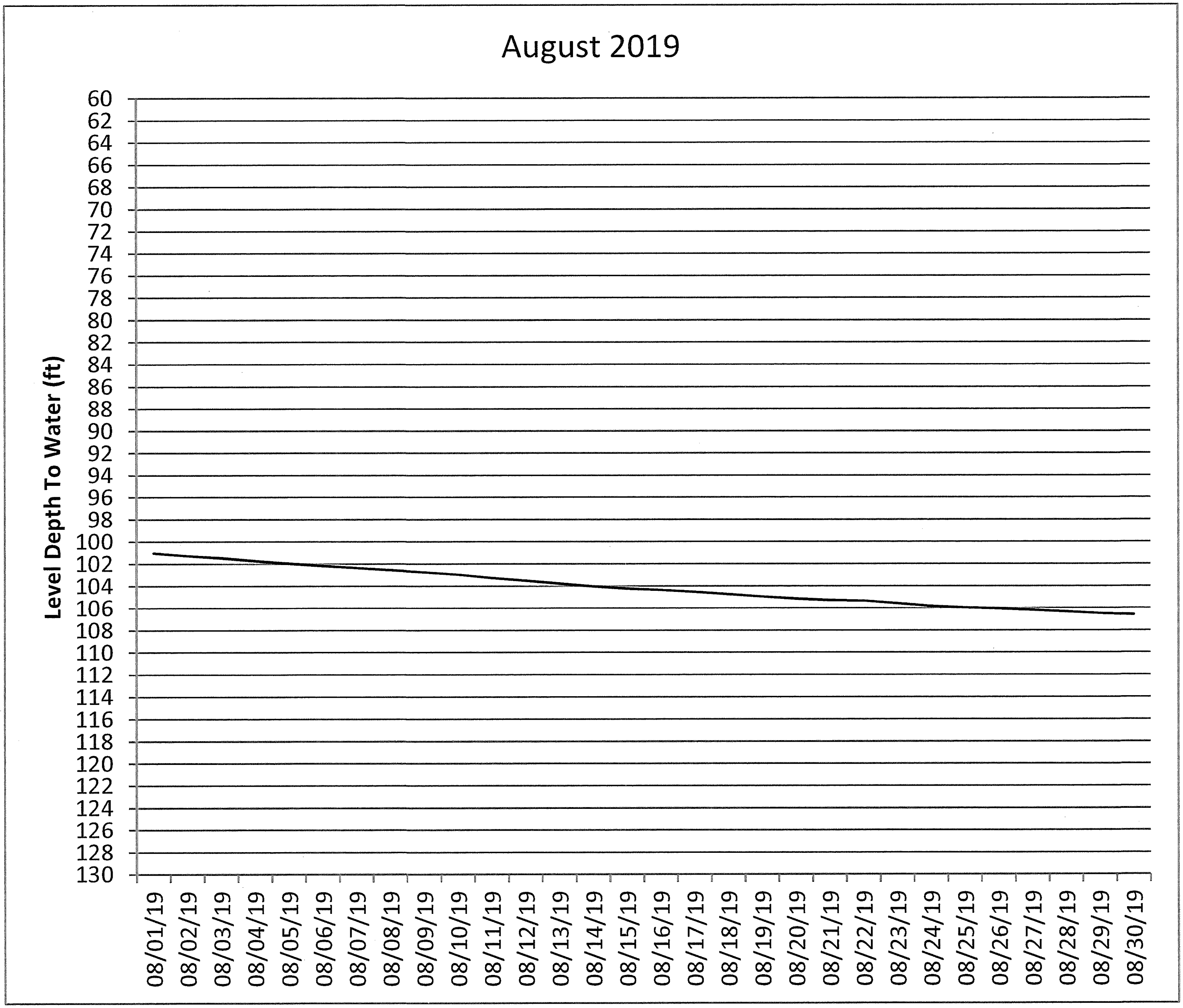
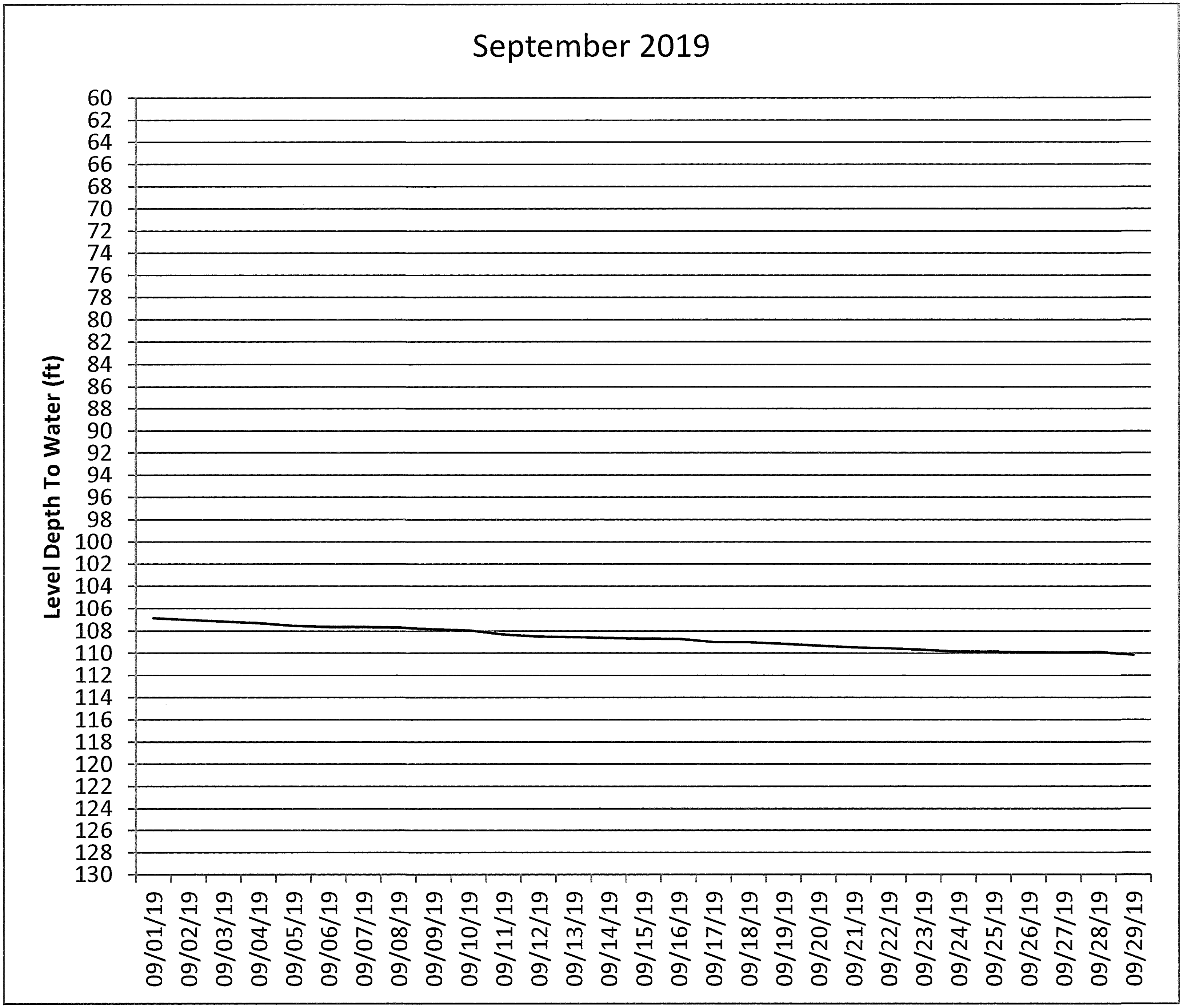
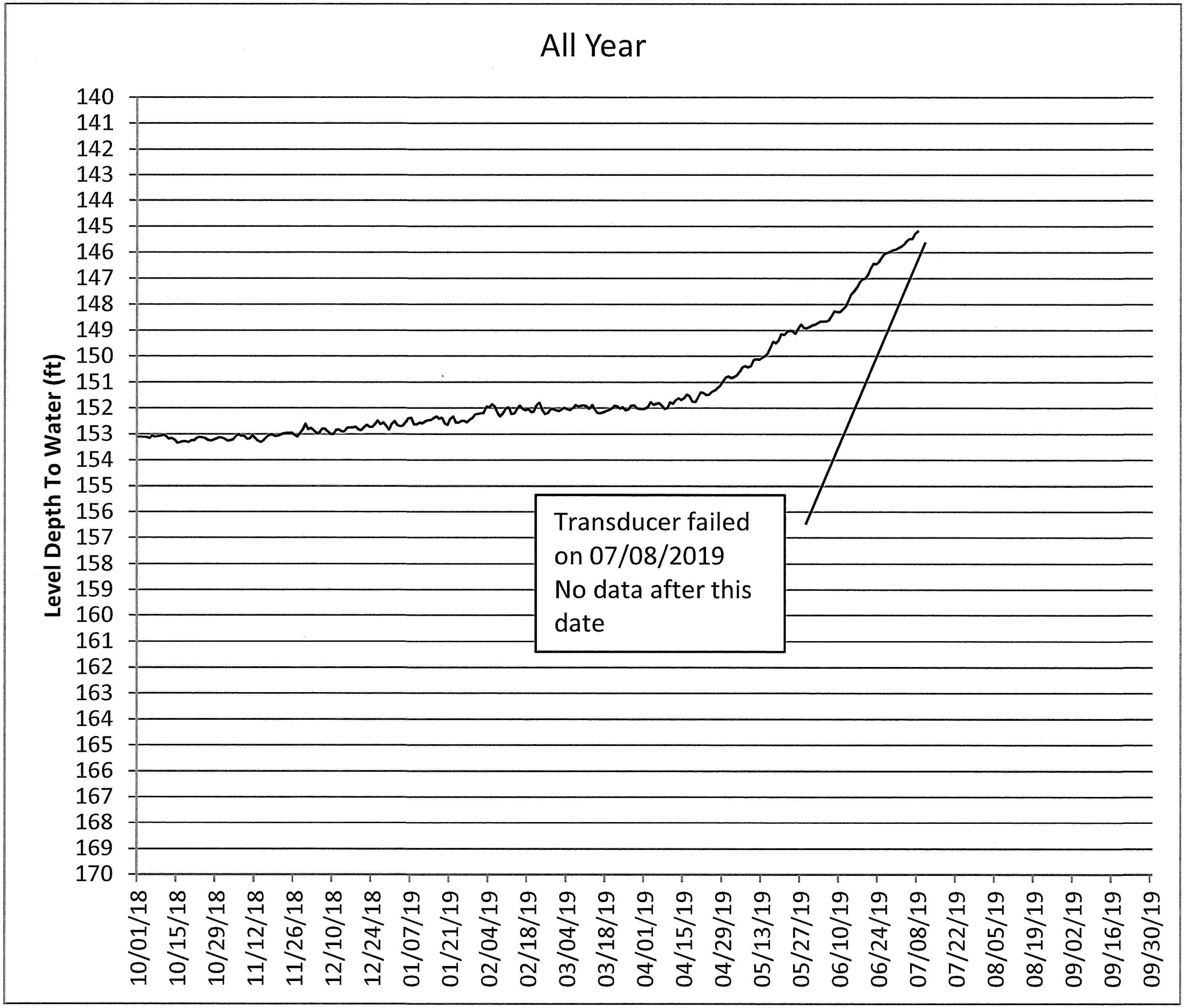


WATER LEVEL HYDROGRAPH FOR MW-SC-1



WATER LEVEL HYDROGRAPH FOR MW-SC-1



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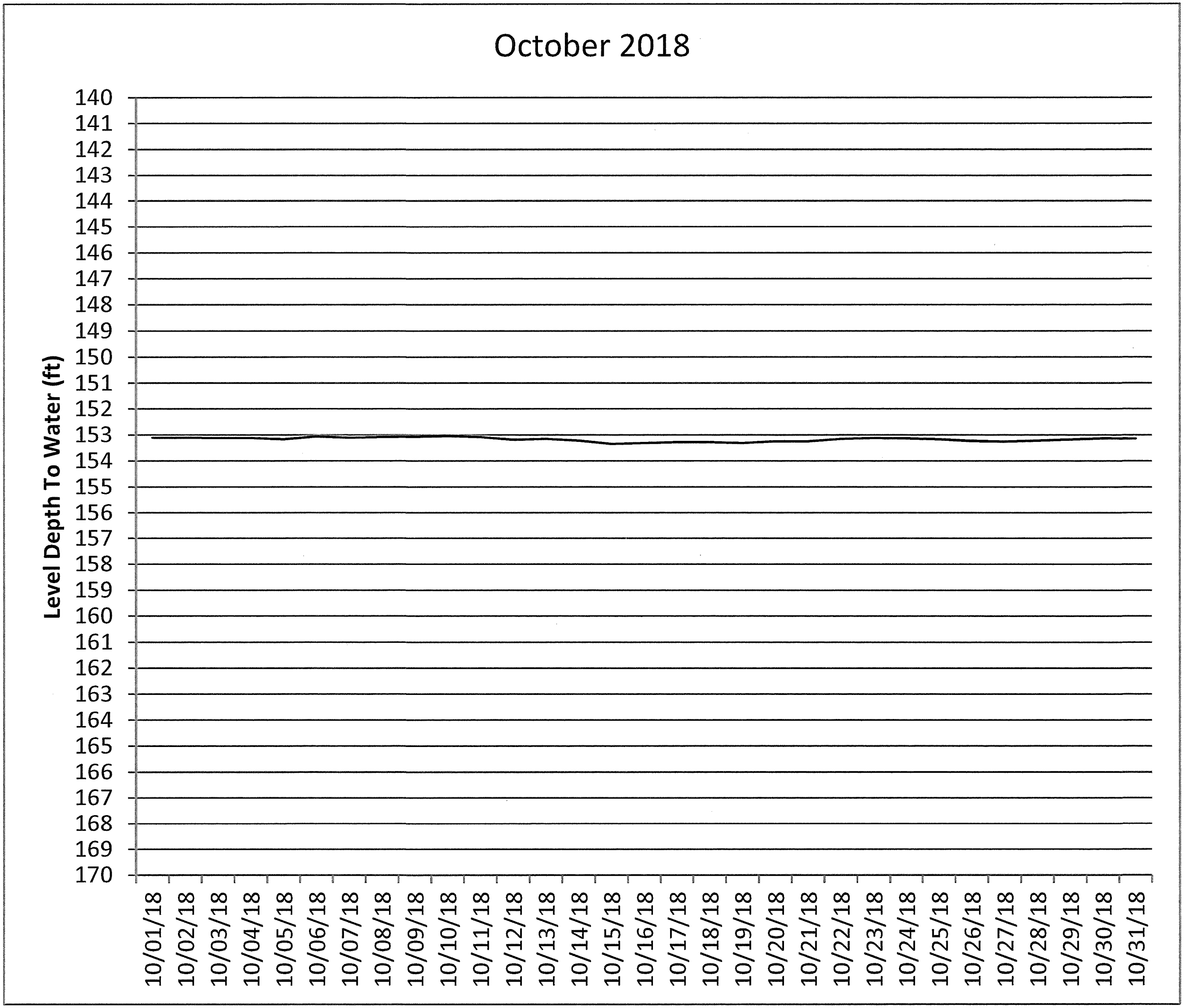

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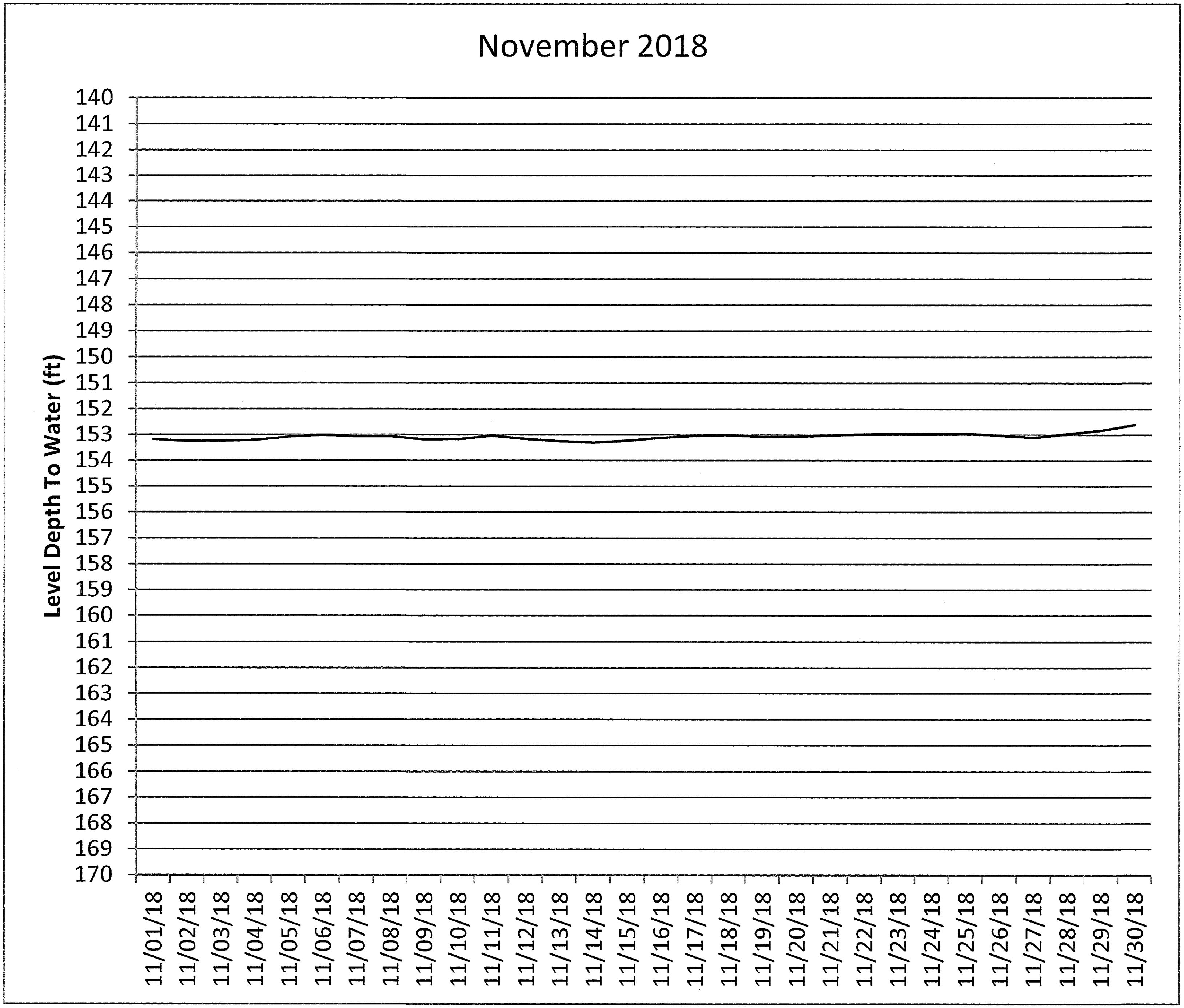

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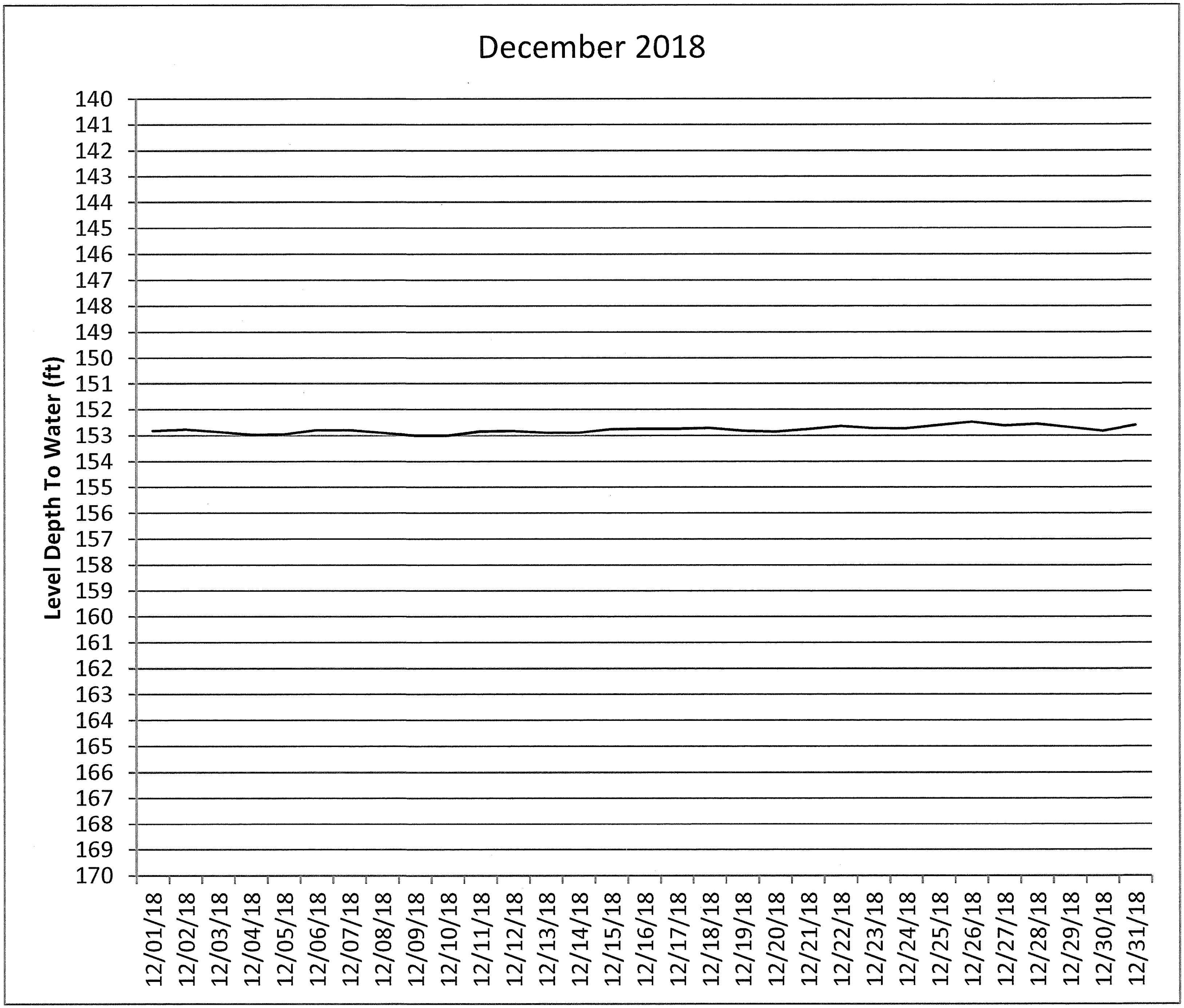

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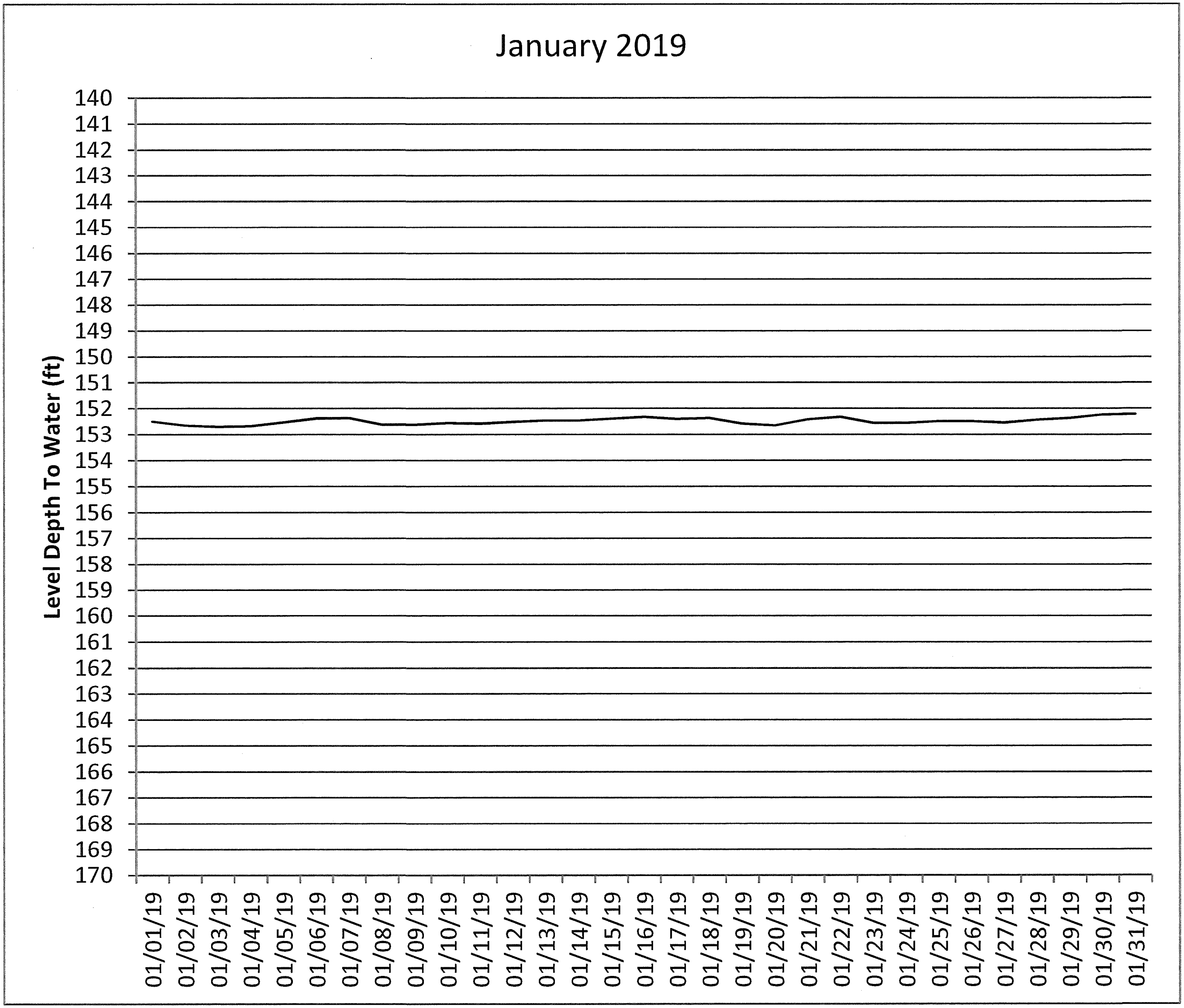

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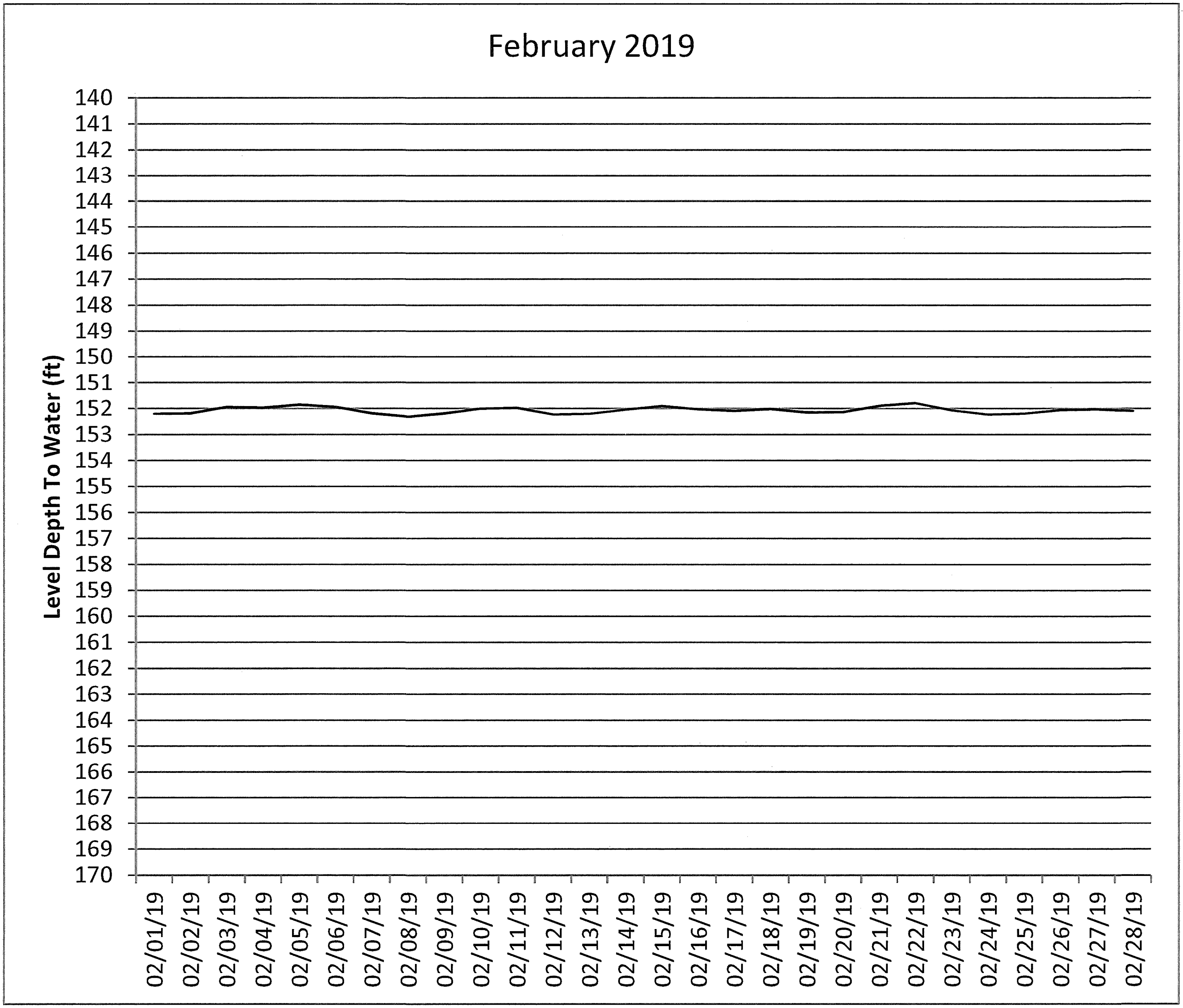

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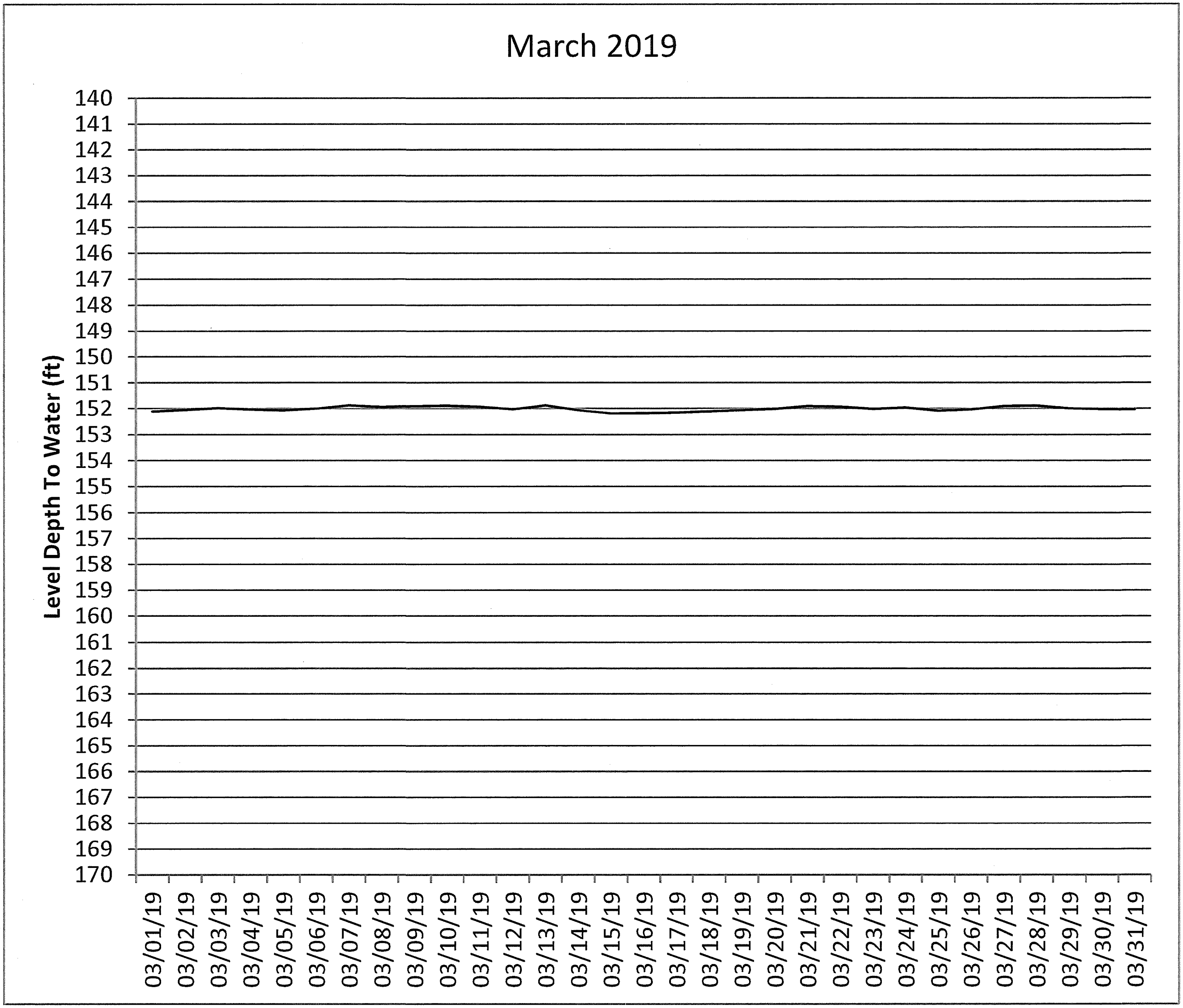

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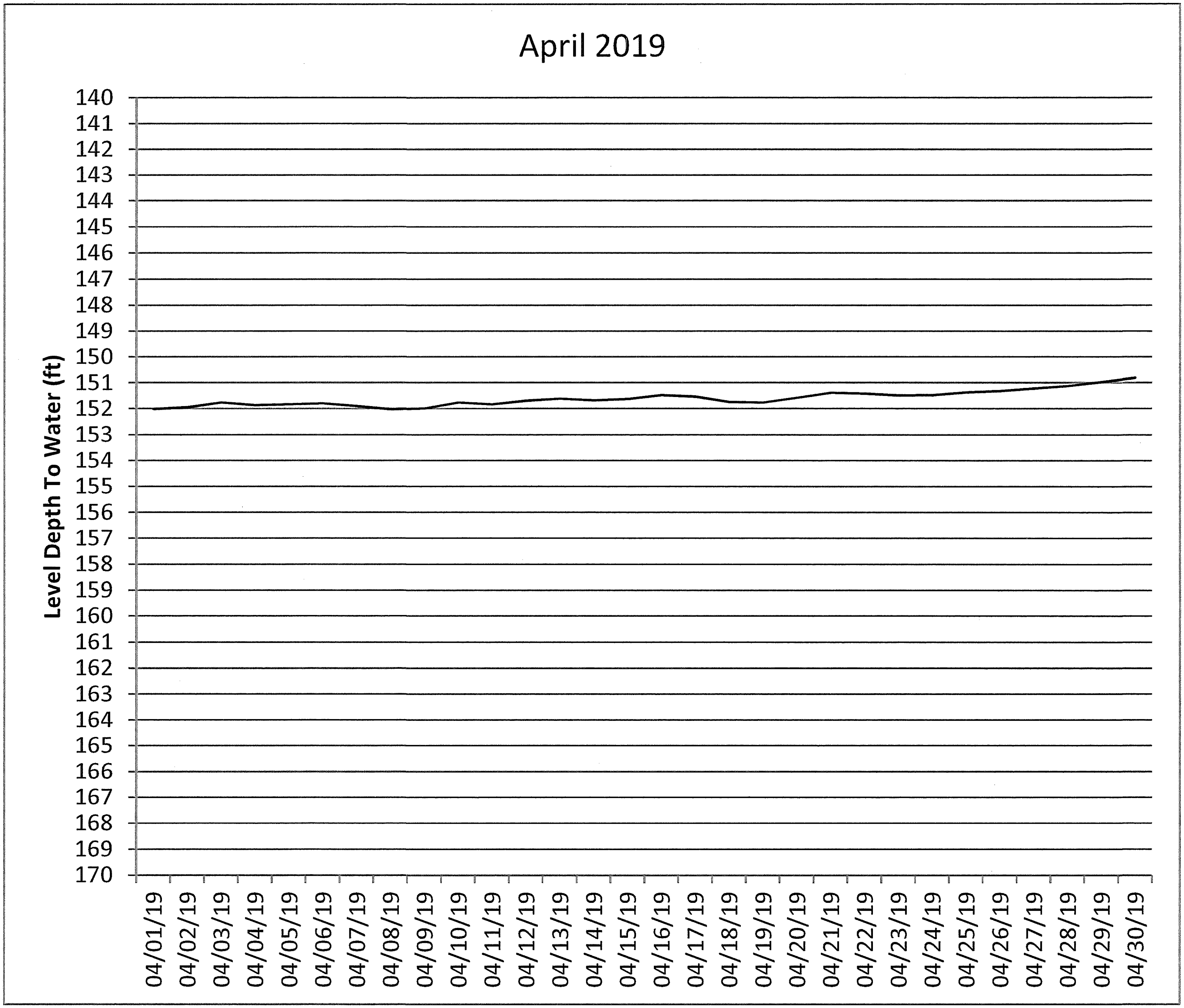
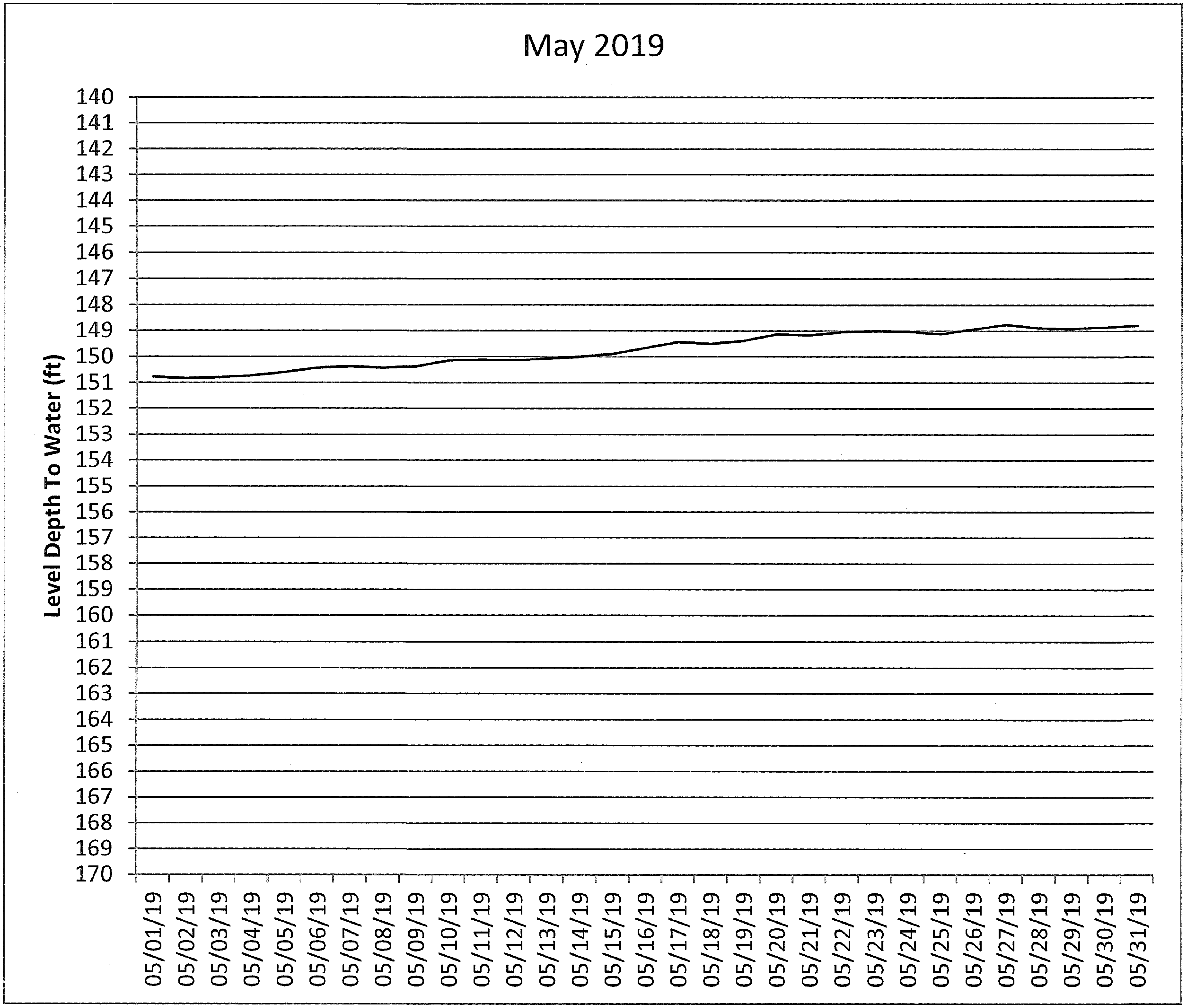
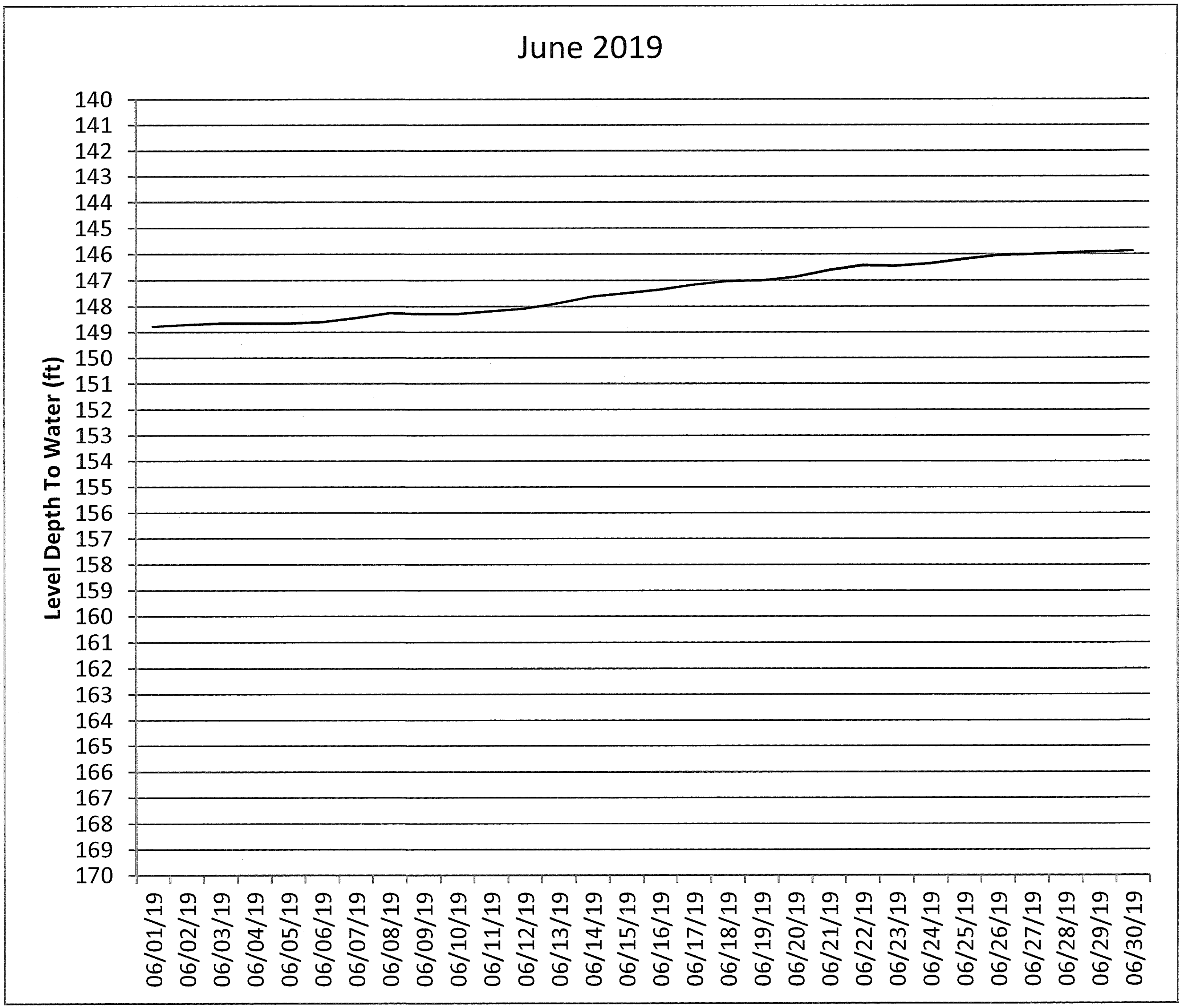


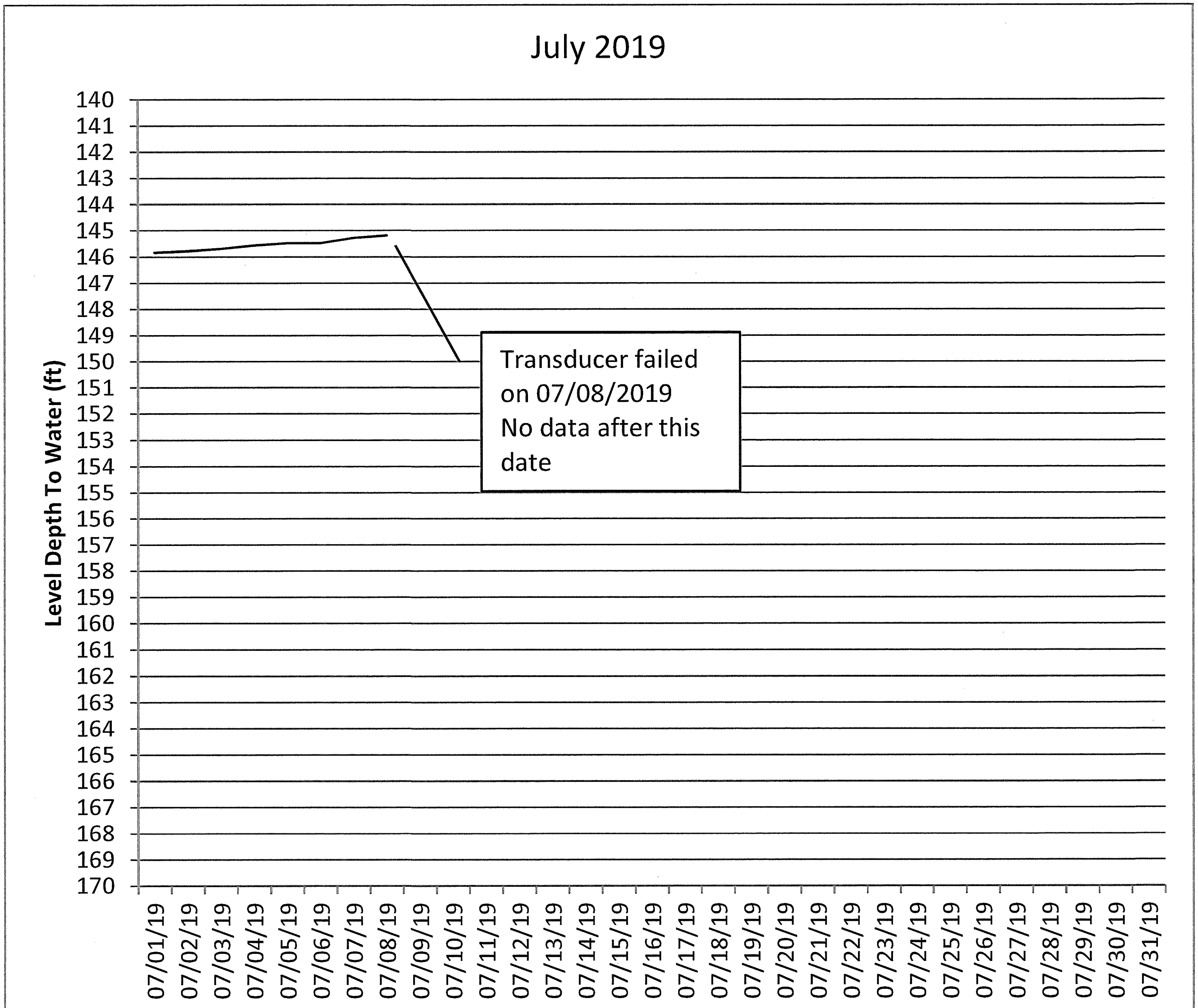
WATER LEVEL HYDROGRAPH FOR MW-SC-2



WATER LEVEL HYDROGRAPH FOR MW-SC-2



WATER LEVEL HYDROGRAPH FOR MW-SC-2



WATER LEVEL HYDROGRAPH FOR MW-SC-2

APPENDIX E

WATER QUALITY ANALYSES OF WATER FROM DISTRICT WELLS

PRODUCTION WELL
ON SITE WATER QUALITY ANALYSIS

Production Well Site	Sample Date	Sample Time	Specific Conductance umho/cm	TDS mg/L	Temp C	pH	Dissolved Oxygen mg/L
1	10/09/18	12:45			8.90	7.07	
1	11/15/18	13:09			8.90	7.13	
1	12/11/18	13:00			7.10	7.18	
1	01/14/19	12:25			7.60	7.09	
1	02/12/19	11:04			7.90	7.09	
1	03/20/19	9:20			8.50	7.57	
1	04/22/19	14:45			9.00	7.45	
1	05/20/19	10:54			7.90	7.14	
1	06/11/19	9:02			8.80	7.08	
1	07/15/19	8:51			8.90	7.11	
1	08/08/19	7:59			8.80	7.08	
1	09/19/19	11:20			8.80	7.26	

PRODUCTION WELL
ON SITE WATER QUALITY ANALYSIS

Production Well Site	Sample Date	Sample Time	Specific Conductance umho/cm	TDS mg/L	Temp C	pH	Dissolved Oxygen mg/L
6	10/09/18	10:02			9.40	7.37	
6	11/15/18	8:41			9.10	7.28	
6	12/11/18	10:08			9.20	7.37	
6	01/14/19	10:05			8.20	7.45	
6	03/19/19	10:54			8.90	7.3	
6	04/23/19	13:10			9.20	7.37	
6	05/20/19	9:30			9.00	7.44	
6	06/11/19	10:01			10.70	7.38	
6	07/15/19	9:11			10.40	7.33	
6	08/08/19	8:47			10.40	7.34	
6	09/19/19	9:36			9.10	7.35	

PRODUCTION WELL
ON SITE WATER QUALITY ANALYSIS

Production Well Site	Sample Date	Sample Time	Specific Conductance umho/cm	TDS mg/L	Temp C	pH	Dissolved Oxygen mg/L
10	10/09/18	10:23			12.50	7.07	
10	11/15/18	8:57			12.20	7.02	
10	12/11/18	10:44			11.70	7.08	
10	01/14/19	9:50			11.00	7.29	
10	03/19/19	10:29			12.30	7.02	
10	04/23/19	13:20			13.50	7.05	
10	05/20/19	9:50			12.10	7.17	
10	06/11/19	10:16			13.20	7.15	
10	07/15/19	9:29			12.80	7.12	
10	08/08/19	9:11			12.90	7.10	
10	09/19/19	9:52			11.90	7.09	

PRODUCTION WELL
ON SITE WATER QUALITY ANALYSIS

Production Well Site	Sample Date	Sample Time	Specific Conductance umho/cm	TDS mg/L	Temp C	pH	Dissolved Oxygen mg/L
15	10/09/18	9:46			10.00	7.46	
15	11/15/18	9:06			9.50	7.43	
15	12/11/18	9:54			9.90	7.47	
15	01/14/19	9:28			8.30	7.63	
15	03/19/19	9:44			9.20	7.40	
15	04/23/19	13:29			11.30	7.50	
15	05/20/19	10:03			7.54	7.54	
15	06/11/19	10:28			10.90	7.48	
15	07/15/19	8:17			11.50	7.43	
15	08/08/19	9:25			10.50	7.51	
15	09/19/19	9:08			9.30	7.46	

PRODUCTION WELL
ON SITE WATER QUALITY ANALYSIS

Production Well Site	Sample Date	Sample Time	Specific Conductance umho/cm	TDS mg/L	Temp C	pH	Dissolved Oxygen mg/L
16	10/09/18	10:36			18.40	6.5	
16	11/15/18	10:30			18.30	6.44	
16	12/11/18	10:52			17.40	6.5	
16	01/14/19	9:22			16.30	6.51	
16	02/12/19	10:49			17.10	6.46	
16	03/19/19	13:32			17.40	6.43	
16	04/24/19	8:29			18.70	6.51	
16	05/20/19	9:56			17.63	6.48	
16	06/11/19	10:37			19.10	6.49	
16	07/15/19	11:01			19.50	6.50	
16	08/08/19	10:04			19.80	6.47	
16	09/19/19	9:43			18.50	6.54	

PRODUCTION WELL
ON SITE WATER QUALITY ANALYSIS

Production Well Site	Sample Date	Sample Time	Specific Conductance umho/cm	TDS mg/L	Temp C	pH	Dissolved Oxygen mg/L
17	10/09/18	9:16			18.40	6.93	
17	11/15/18	10:09			18.40	6.94	
17	12/11/18	9:40			17.40	6.98	
17	01/14/19	8:13			16.70	6.91	
17	02/12/19	13:31			16.70	6.96	
17	03/19/19	13:13			17.30	6.96	
17	04/24/19	8:42			18.00	6.94	
17	05/20/19	10:20			17.20	7.04	
17	06/11/19	9:37			17.90	7.00	
17	07/15/19	10:08			19.20	7.00	
17	08/08/19	8:45			18.10	6.92	
17	09/19/19	8:33			17.30	6.93	

PRODUCTION WELL
ON SITE WATER QUALITY ANALYSIS

Production Well Site	Sample Date	Sample Time	Specific Conductance umho/cm	TDS mg/L	Temp C	pH	Dissolved Oxygen mg/L
18	10/09/18	10:51			18.60	6.83	
18	11/15/18	9:33			18.20	6.78	
18	12/11/18	12:50			18.20	6.83	
18	01/14/19	8:18			15.1	6.67	
18	03/19/19	12:46			18	6.77	
18	04/23/19	14:15			19.6	6.75	
18	05/20/19	8:37			17.3	6.77	
18	06/11/19	8:54			18.9	6.76	
18	07/15/19	10:48			19.7	6.77	
18	08/08/19	9:57			20.3	6.79	
18	09/19/19	10:55			18.90	6.79	

PRODUCTION WELL
ON SITE WATER QUALITY ANALYSIS

Production Well Site	Sample Date	Sample Time	Specific Conductance umho/cm	TDS mg/L	Temp C	pH	Dissolved Oxygen mg/L
20	10/09/18	9:42			13.70	6.61	
20	11/15/18	10:42			14.40	6.71	
20	12/11/18	10:00			12.90	6.58	
20	01/14/19	8:42			12.00	6.6	
20	02/12/19	14:45			11.90	6.67	
20	03/19/19	14:16			13.10	6.72	
20	04/24/19	9:08			14.40	6.67	
20	05/20/19	10:32			13.40	6.72	
20	06/11/19	9:49			14.70	6.68	
20	07/15/19	10:25			15.60	6.65	
20	08/08/19	9:29			14.80	6.64	
20	09/19/19	9:04			13.70	6.60	

PRODUCTION WELL
ON SITE WATER QUALITY ANALYSIS

Production Well Site	Sample Date	Sample Time	Specific Conductance umho/cm	TDS mg/L	Temp C	pH	Dissolved Oxygen mg/L
25	10/09/18	9:30			8.40	7.23	
25	11/15/18	10:23			9.00	7.23	
25	12/11/18	9:50			8.20	7.25	
25	01/14/19	8:23			8.10	7.14	
25	02/12/19	12:40			7.90	7.17	
25	03/19/19	13:22			8.50	7.06	
25	04/24/19	8:53			9.00	7.11	
25	05/20/19	9:45			8.00	7.17	
25	06/11/19	10:28			9.00	7.14	
25	07/15/19	10:16			9.60	7.2	
25	08/08/19	9:02			9.80	7.16	
25	09/19/19	8:55			9.00	7.18	

PRODUCTION WELL
WATER QUALITY

Well Site	Date	Arsenic ug/L	Fe mg/L	Mn mg/L	TURBIDITY	ODOR	COLIFORM	pH
1	10/09/18	4.4	0.120	<0.020	0.56	none	<1.1	7.12
1	11/15/18	2.0	0.120	<0.020	0.54	none	<1.1	7.23
1	12/11/18	3.8	0.400	<0.020	3.22	none	<1.1	7.07
1	01/14/19	3.0	0.280	<0.020	0.17	none	<1.1	7.09
1	02/12/19	3.1	<0.100	<0.020	0.16	none	<1.1	7.09
1	03/20/19	3.7	0.210	<0.020	1.02	none	<1.1	7.57
1	04/22/19	2.9	<0.100	<0.020	0.53	none	<1.1	7.45
1	05/20/19	2.8	0.230	<0.020	1.79	1.3	<1.1	7.05
1	06/11/19	4.3	0.180	<0.020	0.89	none	<1.1	7.08
1	07/15/19	4.5	<0.100	<0.020	0.25	none	<1.1	7.11
1	08/08/19	3.8	<0.100	<0.020	0.10	none	<1.1	7.08
1	09/19/19	4.0	0.160	<0.020	0.92	none	<1.1	7.26

PRODUCTION WELL
WATER QUALITY

Well Site	Date	Arsenic ug/L	Fe mg/L	Mn mg/L	TURBIDITY	ODOR	COLIFORM	pH
6	10/09/18	34.0	0.170	0.370	0.47	none	<1.1	7.35
6	11/15/18	31.0	0.240	0.350	0.85	none	<1.1	7.38
6	12/11/18	40.0	0.420	0.470	3.46	none	<1.1	7.36
6	01/14/19	33.0	0.180	0.380	0.41	none	<1.1	7.45
6	03/19/19	31.0	0.220	0.400	0.68	none	<1.1	7.30
6	04/23/19	58.0	1.000	0.650	5.36	none	<1.1	7.37
6	05/20/19	35.0	0.270	0.390	1.03	none	<1.1	7.37
6	06/11/19	50.0	0.950	0.490	5.85	none	<1.1	7.38
6	07/15/19	36.0	0.350	0.440	2.99	none	<1.1	7.33
6	08/08/19	38.0	0.330	0.400	59.10	none	<1.1	7.34
6	09/19/19	35.0	0.250	0.420	1.08	none	<1.1	7.35

PRODUCTION WELL
WATER QUALITY

Well Site	Date	Arsenic ug/L	Fe mg/L	Mn mg/L	TURBIDITY	ODOR	COLIFORM	pH
10	10/09/18	13.0	0.160	0.059	0.32	none	2	7.12
10	11/15/18	11.0	0.140	0.046	0.28	none	<1.1	7.13
10	12/11/18	12.0	0.140	0.047	0.31	none	<1.1	7.07
10	01/14/19	12.0	0.140	0.045	0.31	none	<1.1	7.29
10	03/19/19	12.0	0.230	0.053	0.46	none	<1.1	7.02
10	04/23/19	12.0	0.160	0.064	0.50	none	<1.1	7.05
10	05/20/19	14.0	0.150	0.096	1.04	none	<1.1	7.24
10	06/11/19	14.0	0.180	0.120	0.47	none	<1.1	7.15
10	07/15/19	13.0	0.190	0.100	0.42	none	<1.1	7.12
10	08/08/19	15.0	0.290	0.110	8.99	none	<1.1	7.10
10	09/19/19	16.0	0.220	0.130	0.81	none	<1.1	7.09

PRODUCTION WELL
WATER QUALITY

Well Site	Date	Arsenic ug/L	Fe mg/L	Mn mg/L	TURBIDITY	ODOR	COLIFORM	pH
15	10/09/18	9.6	<0.100	<0.020	0.09	none	<1.1	7.46
15	11/15/18	7.1	<0.100	<0.020	0.09	none	<1.1	7.56
15	12/11/18	8.7	<0.100	<0.020	0.08	none	<1.1	7.52
15	01/14/19	8.5	<0.100	<0.020	0.10	none	<1.1	7.63
15	03/19/19	7.4	<0.100	<0.020	0.12	none	<1.1	7.40
15	04/23/19	8.1	<0.100	<0.020	0.15	none	<1.1	7.50
15	05/20/19	7.9	<0.100	<0.020	0.64	none	<1.1	7.52
15	06/11/19	9.0	<0.100	<0.020	0.06	none	<1.1	7.48
15	07/15/19	9.7	<0.100	<0.020	0.13	none	<1.1	7.43
15	08/08/19	9.1	<0.100	<0.020	0.58	none	<1.1	7.51
15	09/19/19	8.6	<0.100	<0.020	0.29	none	<1.1	7.46

PRODUCTION WELL
WATER QUALITY

Well Site	Date	Arsenic ug/L	Fe mg/L	Mn mg/L	TURBIDITY	ODOR	COLIFORM	pH
16	10/09/18	38.0	9.800	0.560	64.70	iron odor	<1.1	6.45
16	11/15/18	19.0	3.700	0.150	24.20	iron odor	<1.1	6.52
16	12/11/18	31.0	5.800	0.460	37.30	iron odor	<1.1	6.46
16	01/14/19	28.0	5.600	0.480	29.30	none	<1.1	6.51
16	02/12/19	9.0	1.300	0.110	7.02	none	<1.1	6.46
16	03/19/19	6.8	0.900	0.130	3.96	none	<1.1	6.43
16	04/24/19	6.3	0.630	0.110	3.05	none	<1.1	6.51
16	05/20/19	19.0	3.200	0.470	19.60	none	<1.1	6.48
16	06/11/19	6.7	0.760	0.130	31.30	none	<1.1	6.49
16	07/15/19	23.0	3.700	0.200	20.80	none	<1.1	6.50
16	08/08/19	15.0	2.600	0.250	15.50	none	<1.1	6.47
16	09/19/19	25.0	4.700	0.470	26.00	none	<1.1	6.54

PRODUCTION WELL
WATER QUALITY

Well Site	Date	Arsenic ug/L	Fe mg/L	Mn mg/L	TURBIDITY	ODOR	COLIFORM	pH
17	10/09/18	75.0	0.270	0.027	1.03	none	<1.1	6.94
17	11/15/18	73.0	0.850	0.023	5.18	none	<1.1	6.99
17	12/11/18	62.0	0.210	0.022	0.87	none	<1.1	6.97
17	01/14/19	58.0	0.360	0.020	2.00	none	<1.1	6.91
17	02/12/19	55.0	0.210	0.020	0.77	none	<1.1	6.96
17	03/19/19	63.0	0.280	0.022	0.97	none	<1.1	6.96
17	04/24/19	57.0	0.180	0.021	0.68	none	<1.1	6.94
17	05/20/19	54.0	0.490	<0.020	2.04	none	<1.1	7.02
17	06/11/19	51.0	0.270	<0.020	1.06	none	<1.1	7.00
17	07/15/19	58.0	0.130	<0.020	0.32	none	<1.1	7.00
17	08/08/19	50.0	0.130	<0.020	0.32	none	<1.1	6.92
17	09/19/19	45.0	0.230	<0.020	0.69	none	<1.1	6.93

PRODUCTION WELL
WATER QUALITY

Well Site	Date	Arsenic ug/L	Fe mg/L	Mn mg/L	TURBIDITY	ODOR	COLIFORM	pH
18	10/09/18	12.0	13.000	2.500	2.20	none	<1.1	6.81
18	11/15/18	21.0	12.000	1.900	10.10	none	<1.1	6.85
18	12/11/18	18.0	11.000	2.100	11.60	none	<1.1	6.80
18	01/14/19	9.9	4.500	2.800	2.84	6	<1.1	6.67
18	03/19/19	16.0	9.100	1.600	10.30	iron odor	<1.1	6.77
18	04/23/19	16.0	9.400	1.300	21.80	8	<1.1	6.75
18	05/20/19	12.0	8.600	1.300	3.08	1.3	<1.1	6.76
18	06/11/19	14.0	9.200	1.200	10.30	5.7	<1.1	6.76
18	07/15/19	16.0	12.000	0.980	4.63	4	<1.1	6.77
18	08/08/19	16.0	11.000	1.100	9.25	5.71	<1.1	6.79
18	09/19/19	21.0	14.000	1.000	17.10	8	<1.1	6.79

PRODUCTION WELL
WATER QUALITY

Well Site	Date	Arsenic ug/L	Fe mg/L	Mn mg/L	TURBIDITY	ODOR	COLIFORM	pH
20	10/09/18	5.5	0.480	0.076	0.53	none	<1.1	6.64
20	11/15/18	5.4	0.570	0.067	1.64	none	<1.1	6.68
20	12/11/18	5.8	0.450	0.066	0.46	none	<1.1	6.59
20	01/14/19	4.9	0.480	0.065	0.53	none	<1.1	6.60
20	02/12/19	9.7	0.660	0.063	3.43	none	<1.1	6.67
20	03/19/19	6.3	0.710	0.071	2.04	none	<1.1	6.72
20	04/24/19	5.3	0.390	0.073	0.70	none	<1.1	6.67
20	05/20/19	5.6	0.430	0.066	0.71	none	<1.1	6.70
20	06/11/19	6.3	0.450	0.068	0.97	none	<1.1	6.68
20	07/15/19	5.2	0.350	0.069	0.20	none	<1.1	6.65
20	08/08/19	5.4	0.390	0.064	0.32	none	<1.1	6.64
20	09/19/19	5.5	0.460	0.073	0.49	none	<1.1	6.60

PRODUCTION WELL
WATER QUALITY

Well Site	Date	Arsenic ug/L	Fe mg/L	Mn mg/L	TURBIDITY	ODOR	COLIFORM	pH
25	10/09/18	2.0	0.110	<0.020	0.85	none	<1.1	7.21
25	11/15/18	<2.0	0.520	<0.020	3.13	none	<1.1	7.31
25	12/11/18	2.8	0.120	<0.020	0.61	none	<1.1	7.19
25	01/14/19	2.1	0.270	<0.020	1.84	none	<1.1	7.14
25	02/12/19	2.3	<0.100	<0.020	0.49	none	<1.1	7.17
25	03/19/19	2.0	0.420	<0.020	2.25	none	<1.1	7.06
25	04/24/19	ND	0.120	<0.020	1.13	none	<1.1	7.11
25	05/20/19	3.6	1.700	0.064	10.70	none	<1.1	7.05
25	06/11/19	2.9	0.720	0.029	2.77	none	<1.1	7.14
25	07/15/19	2.9	0.170	<0.020	0.74	none	<1.1	7.20
25	08/08/19	2.8	0.160	<0.020	0.61	none	<1.1	7.16
25	09/19/19	3.0	0.140	<0.020	0.90	none	<1.1	7.18

APPENDIX F

MAMMOTH CREEK STREAMFLOW

Mammoth Creek at Old Mammoth Road

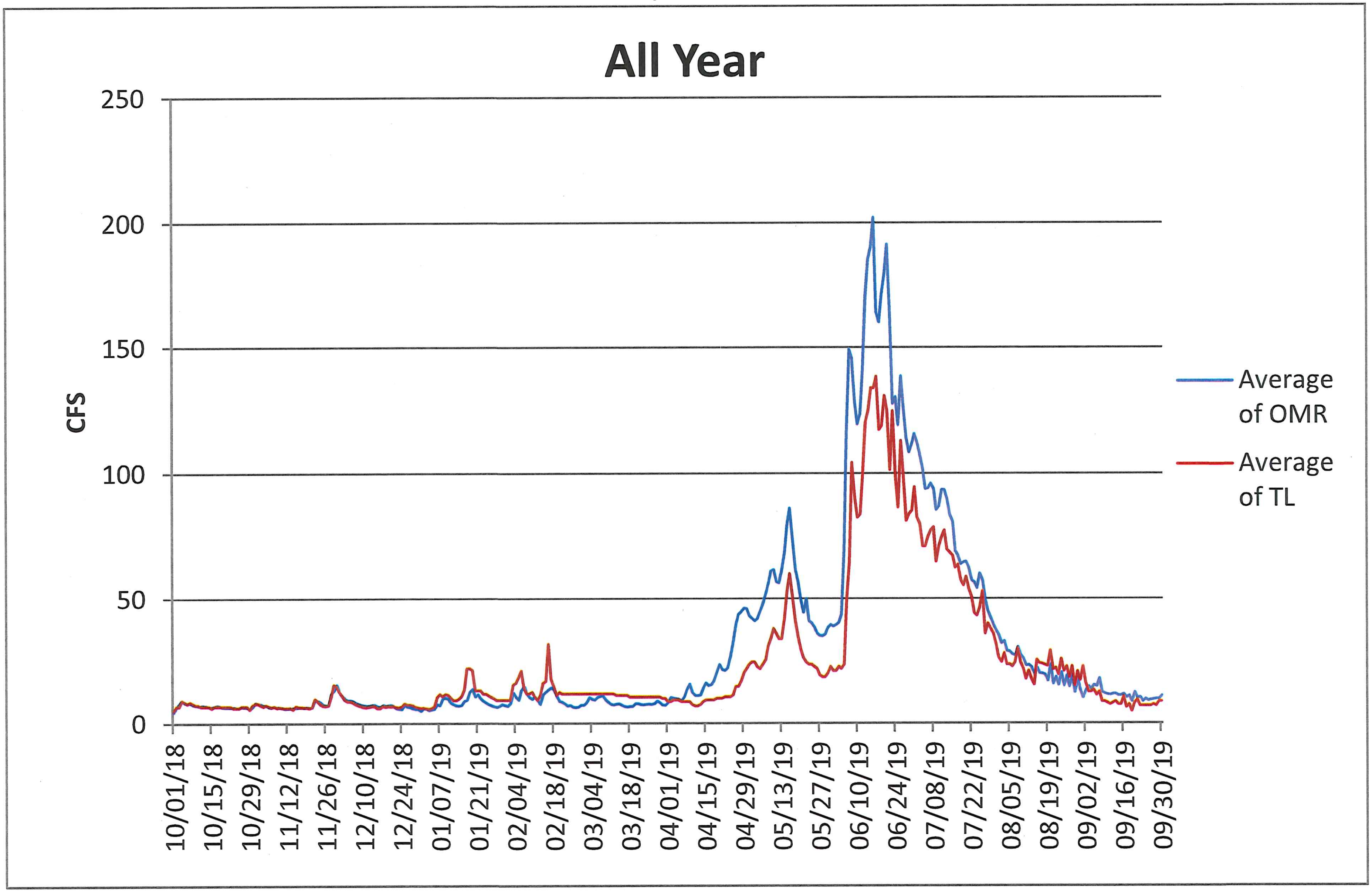
Daily discharge in cubic feet per second												
	2018			2019								
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	4.74	8.11	12.75	6.14	6.90	7.30	8.20	43.10	38.70	115.62	35.10	10.20
2	6.66	7.74	11.39	6.11	8.10	8.30	10.40	41.90	39.30	112.28	32.10	13.30
3	7.93	7.24	9.93	5.37	12.40	10.40	10.00	41.00	40.20	107.36	32.90	14.80
4	9.38	7.35	9.29	5.59	10.60	9.70	9.80	41.80	43.70	101.81	29.10	13.60
5	8.44	6.75	9.41	5.83	9.38	9.40	9.60	44.80	69.70	93.78	28.80	15.40
6	8.22	6.61	8.98	7.75	13.33	10.50	9.00	47.90	115.60	93.95	27.70	14.93
7	8.28	6.90	8.38	7.24	14.89	10.80	10.70	51.50	149.10	95.99	27.20	18.08
8	7.66	6.51	7.93	10.03	11.90	11.10	13.60	55.70	145.70	93.83	30.60	12.47
9	7.48	6.54	7.56	10.26	10.50	9.50	15.80	60.90	128.50	85.36	27.40	11.90
10	7.30	6.35	7.26	9.94	9.70	8.50	12.30	61.50	119.50	86.90	26.10	11.60
11	7.18	6.09	7.04	8.34	10.70	7.60	11.20	56.70	123.60	93.40	23.30	11.40
12	7.19	6.16	7.22	7.70	9.39	7.40	11.10	56.20	141.60	93.50	23.50	11.80
13	7.08	6.16	7.47	7.19	7.69	7.70	11.30	61.20	170.40	89.80	22.50	11.80
14	6.86	6.22	7.50	7.08	11.66	7.80	14.35	68.30	185.30	83.40	20.00	11.10
15	6.62	6.32	6.83	7.31	12.70	7.30	16.30	79.50	190.50	80.90	22.30	11.20
16	6.91	6.53	6.75	9.05	13.70	6.70	15.20	86.00	202.00	69.10	20.10	11.80
17	7.22	6.49	7.42	9.38	14.40	6.50	15.60	73.70	164.10	67.10	20.00	10.30
18	6.98	6.47	7.15	12.80	13.70	6.70	17.40	61.50	160.20	63.70	19.50	11.00
19	6.64	6.53	7.25	13.99	11.00	6.70	20.40	56.70	171.20	64.40	17.10	8.70
20	6.58	6.38	7.43	10.82	8.90	7.90	23.60	49.80	179.60	64.70	23.60	12.50
21	6.58	6.49	7.00	11.80	8.60	7.90	21.60	44.30	191.40	62.10	15.90	10.10
22	6.49	9.52	6.13	10.17	7.90	7.50	21.30	49.80	163.20	57.30	18.60	10.40
23	6.49	9.22	5.91	9.08	7.00	7.40	22.30	40.90	127.70	56.50	15.40	8.70
24	6.41	8.54	5.76	8.30	7.20	7.60	26.60	40.10	130.40	54.20	20.50	9.70
25	6.37	7.56	7.44	7.70	6.50	7.70	32.60	38.40	119.10	60.00	15.10	9.00
26	6.73	7.32	6.76	7.20	6.40	7.60	39.50	36.00	138.80	57.40	19.20	9.40
27	6.64	7.56	6.57	6.80	6.50	7.80	43.60	35.00	126.10	49.70	14.70	9.50
28	6.49	12.01	6.07	6.50	7.30	8.90	44.60	34.90	114.30	44.90	19.20	9.70
29	5.90	13.40	5.85	7.00		8.30	46.05	35.60	108.30	42.20	12.44	9.70
30	6.77	15.67	5.84	7.60		7.30	45.90	38.30	111.40	39.40	18.10	11.00
31	8.29		5.08	7.20		7.20		39.40		37.20	13.30	
Average	7.05	7.69	7.53	8.30	9.96	8.16	20.33	50.72	130.31	74.77	22.30	11.50
Maximum	9.38	15.67	12.75	13.99	14.89	11.10	46.05	86.00	202.00	115.62	35.10	18.08
Minimum	4.74	6.09	5.08	5.37	6.40	6.50	8.20	34.90	38.70	37.20	12.44	8.70

Twin Lakes Outflow

Daily discharge in cubic feet per second

	2018			2019								
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	5.25	8.09	12.78	6.34	9.33	11.99	8.70	23.75	21.19	94.55	26.40	22.88
2	6.91	7.49	11.20	6.06	9.33	11.99	8.70	24.62	21.19	82.43	24.62	16.37
3	6.91	6.91	9.61	5.93	15.61	11.99	9.33	24.62	22.88	79.82	28.22	12.69
4	9.33	7.49	8.89	6.15	16.37	11.99	9.33	22.88	22.03	70.88	23.75	12.69
5	8.70	6.91	8.92	6.93	18.73	11.99	9.33	22.03	23.75	70.88	23.75	13.40
6	8.09	6.65	8.43	10.57	21.19	11.99	8.70	23.75	49.60	74.67	22.88	11.31
7	8.70	6.94	7.83	11.96	14.13	11.99	8.70	25.50	64.72	77.23	24.62	12.69
8	8.09	6.40	7.33	10.93	11.99	11.99	8.70	31.02	104.35	78.52	30.08	8.70
9	7.49	6.57	7.01	11.82	11.99	11.99	8.70	33.92	90.45	64.72	24.62	8.70
10	7.49	6.32	6.70	11.67	12.69	11.99	7.49	37.90	82.43	70.88	22.03	8.09
11	6.91	6.22	6.62	10.52	10.63	11.99	6.91	35.89	83.75	74.67	17.93	7.49
12	6.91	6.26	6.78	9.33	9.33	11.99	6.91	33.92	100.11	77.23	21.19	8.09
13	6.91	6.29	7.09	9.33	11.31	11.31	7.49	33.92	120.39	69.63	17.93	8.70
14	6.91	5.78	6.98	9.97	16.37	11.31	8.70	42.04	124.89	68.40	15.61	7.49
15	6.34	6.99	6.27	11.10	17.15	11.31	9.33	52.97	134.07	67.16	25.50	7.49
16	6.91	6.64	6.24	13.69	31.98	11.31	9.33	59.93	134.07	62.31	24.18	10.63
17	6.91	6.58	7.07	22.25	17.93	11.31	9.33	50.72	138.73	63.51	23.92	6.34
18	6.91	6.51	6.77	22.34	14.86	10.63	9.33	40.99	117.42	57.58	23.49	7.49
19	6.91	6.47	7.02	21.60	11.31	10.63	9.98	34.90	118.90	55.26	23.05	4.74
20	6.91	6.27	6.95	13.40	12.69	10.63	9.98	30.08	130.99	58.75	29.20	8.09
21	6.91	6.64	6.97	13.40	11.99	10.63	9.98	26.40	124.89	54.11	21.63	9.33
22	6.91	9.92	6.61	13.40	11.99	10.63	10.63	24.62	101.52	50.72	22.34	6.91
23	6.34	9.01	6.46	11.99	11.99	10.63	10.63	23.75	124.89	44.16	19.65	6.91
24	6.34	7.79	6.87	11.99	11.99	10.63	10.63	23.75	100.11	43.09	25.86	6.91
25	6.34	7.17	8.12	11.31	11.99	10.63	11.31	22.88	86.41	46.31	21.02	6.91
26	6.91	7.05	7.65	10.63	11.99	10.63	14.86	22.03	113.00	52.97	22.84	6.91
27	6.91	7.36	7.60	9.98	11.99	10.63	14.86	19.54	98.71	35.89	18.57	7.49
28	6.91	11.05	7.34	9.33	11.99	10.63	17.15	18.73	81.12	39.95	22.96	6.91
29	5.79	15.78	6.71	9.33		10.63	20.36	18.73	83.75	37.90	15.21	8.70
30	7.49	15.02	6.44	9.33		9.98	22.03	20.36	85.08	35.89	20.84	8.70
31	8.09		6.20	9.33		9.98		22.88		31.98	17.35	
Average	7.11	7.69	7.53	11.35	13.96	11.23	10.58	29.97	90.18	61.03	22.62	9.33
Maximum	9.33	15.78	12.78	22.34	31.98	11.99	22.03	59.93	138.73	94.55	30.08	22.88
Minimum	5.25	5.78	6.20	5.93	9.33	9.98	6.91	18.73	21.19	31.98	15.21	4.74

MAMMOTH COMMUNITY WATER DISTRICT
MAMMOTH CREEK
TWIN LAKES/OLD MAMMOTH



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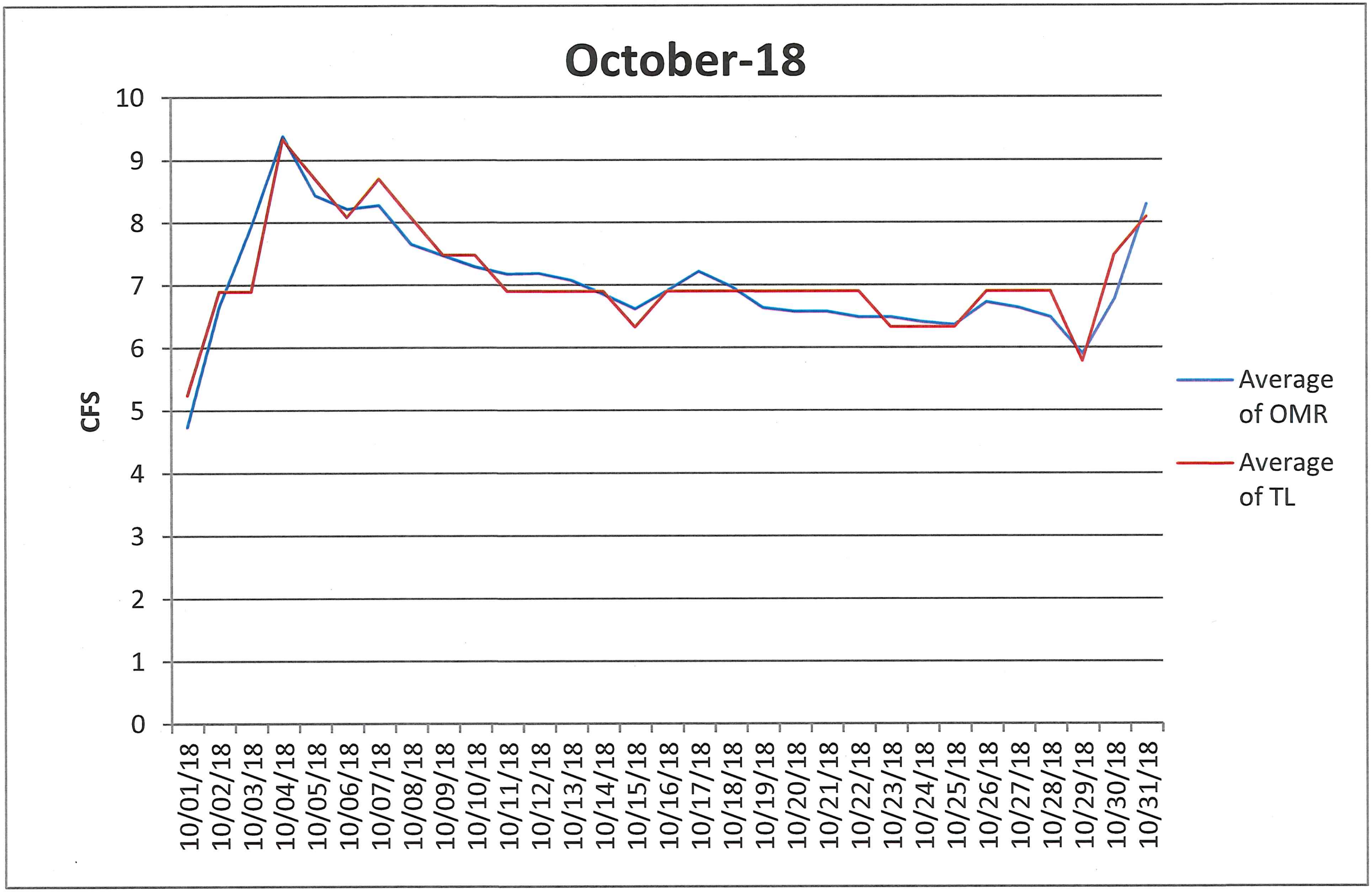

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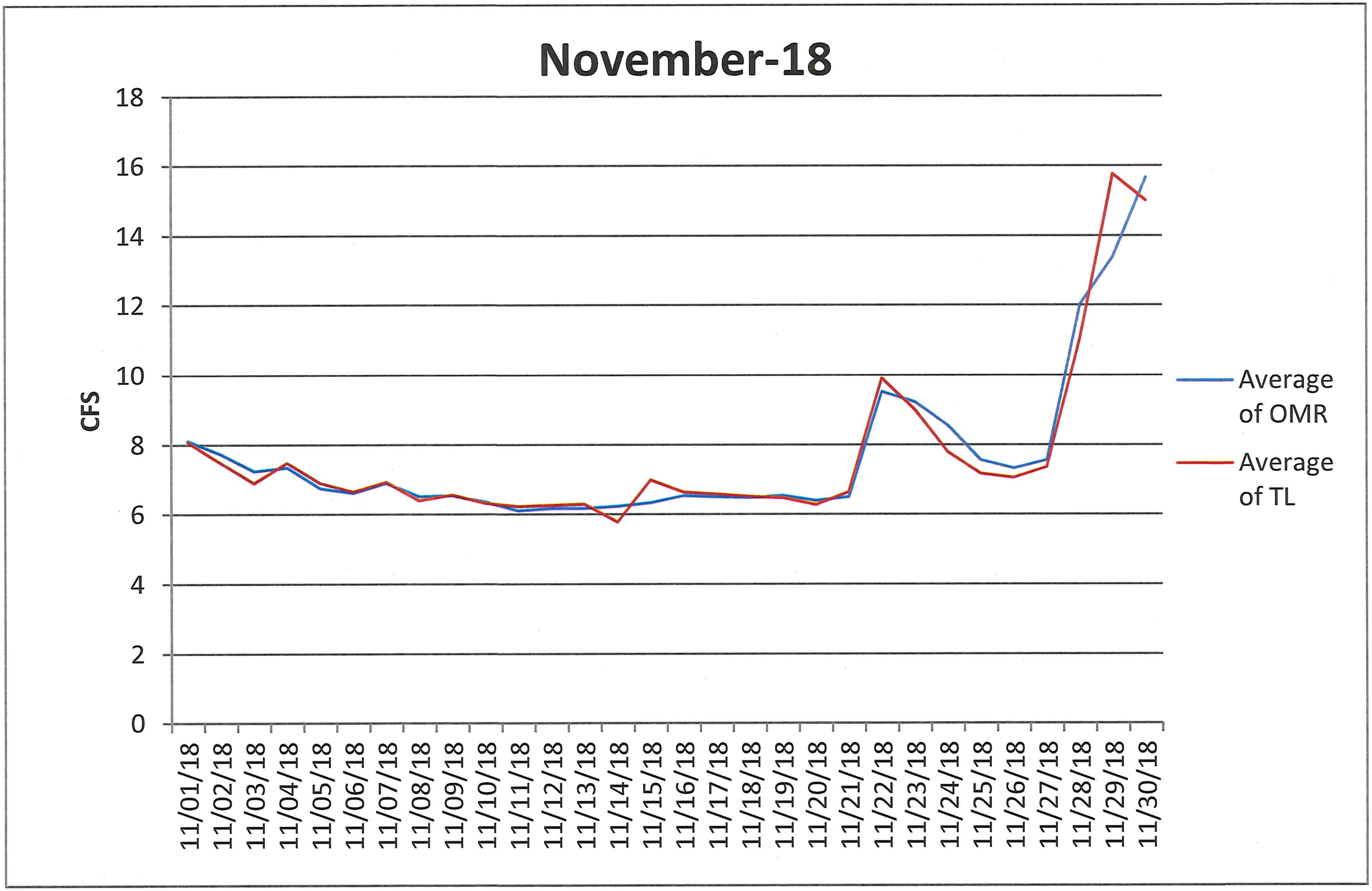

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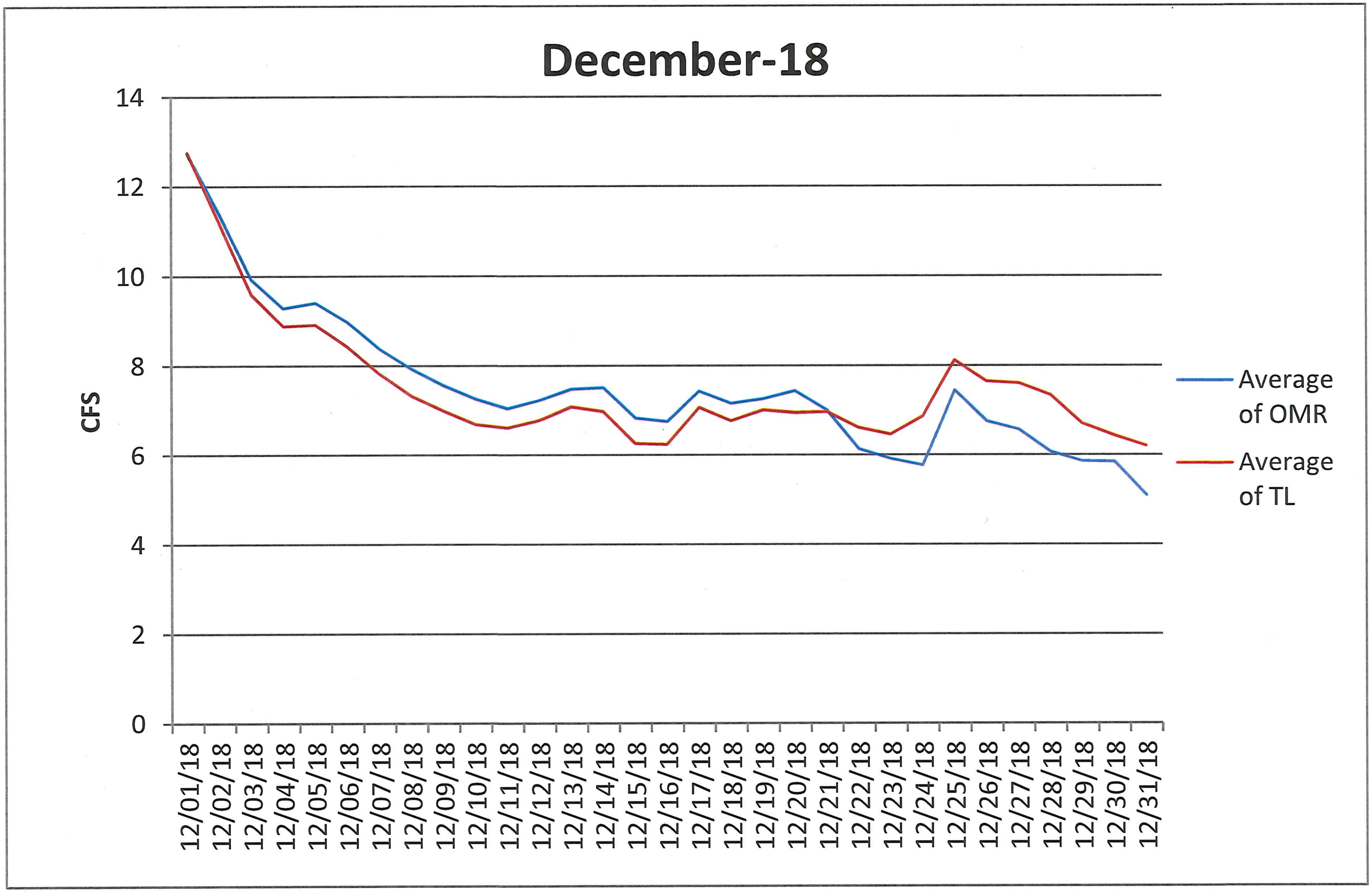

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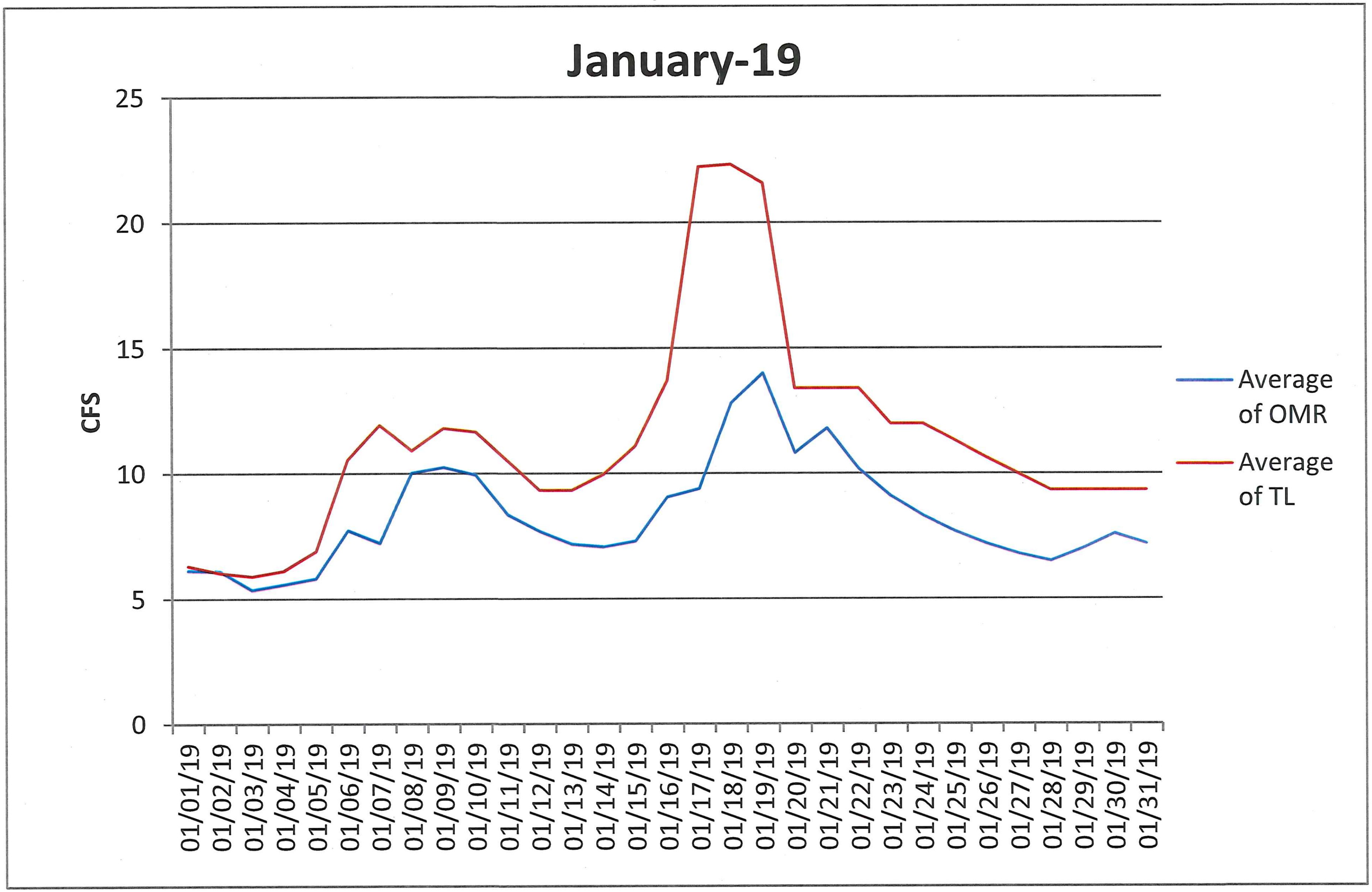

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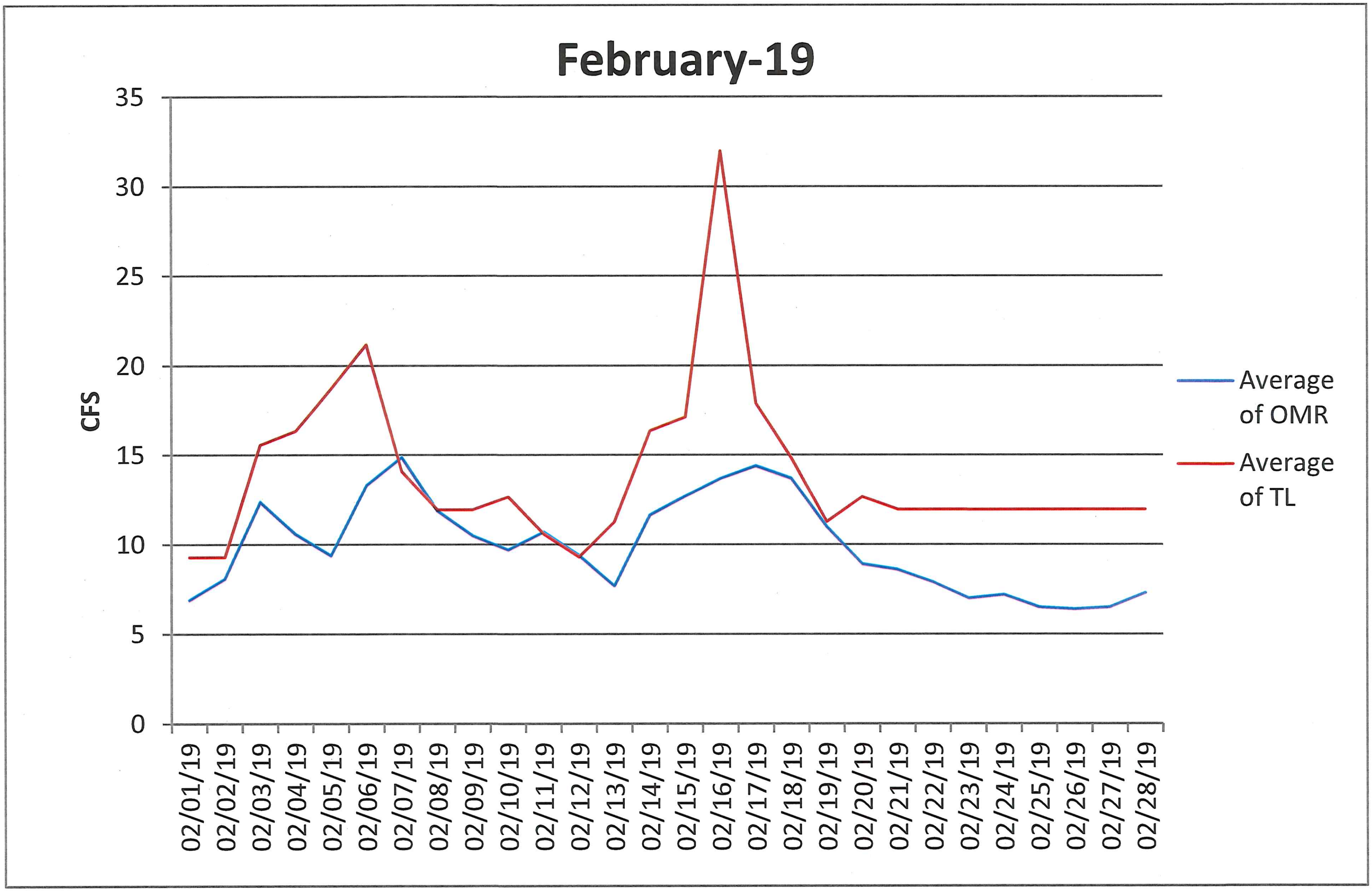

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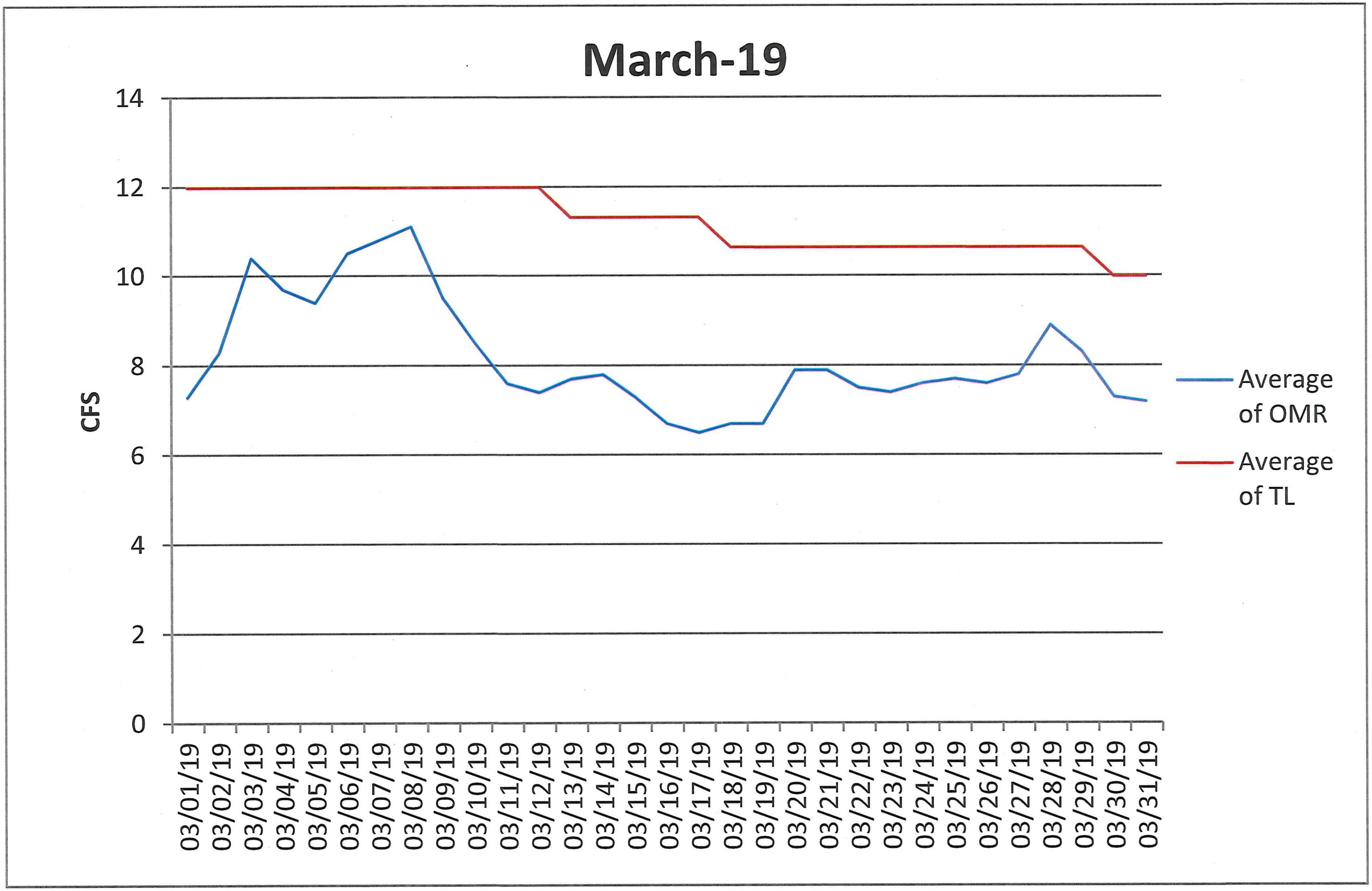

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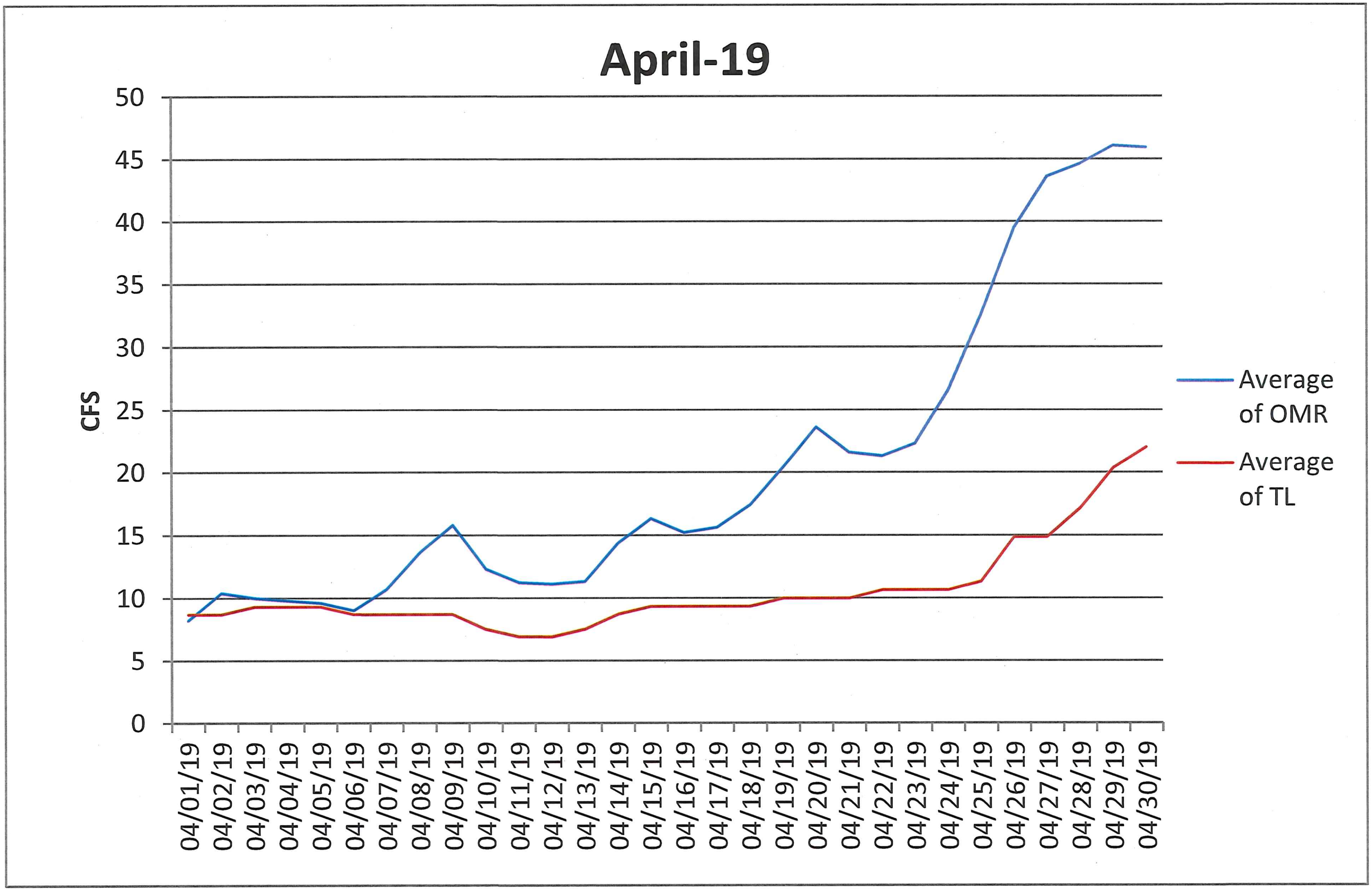
TWIN LAKES/OLD MAMMOTH



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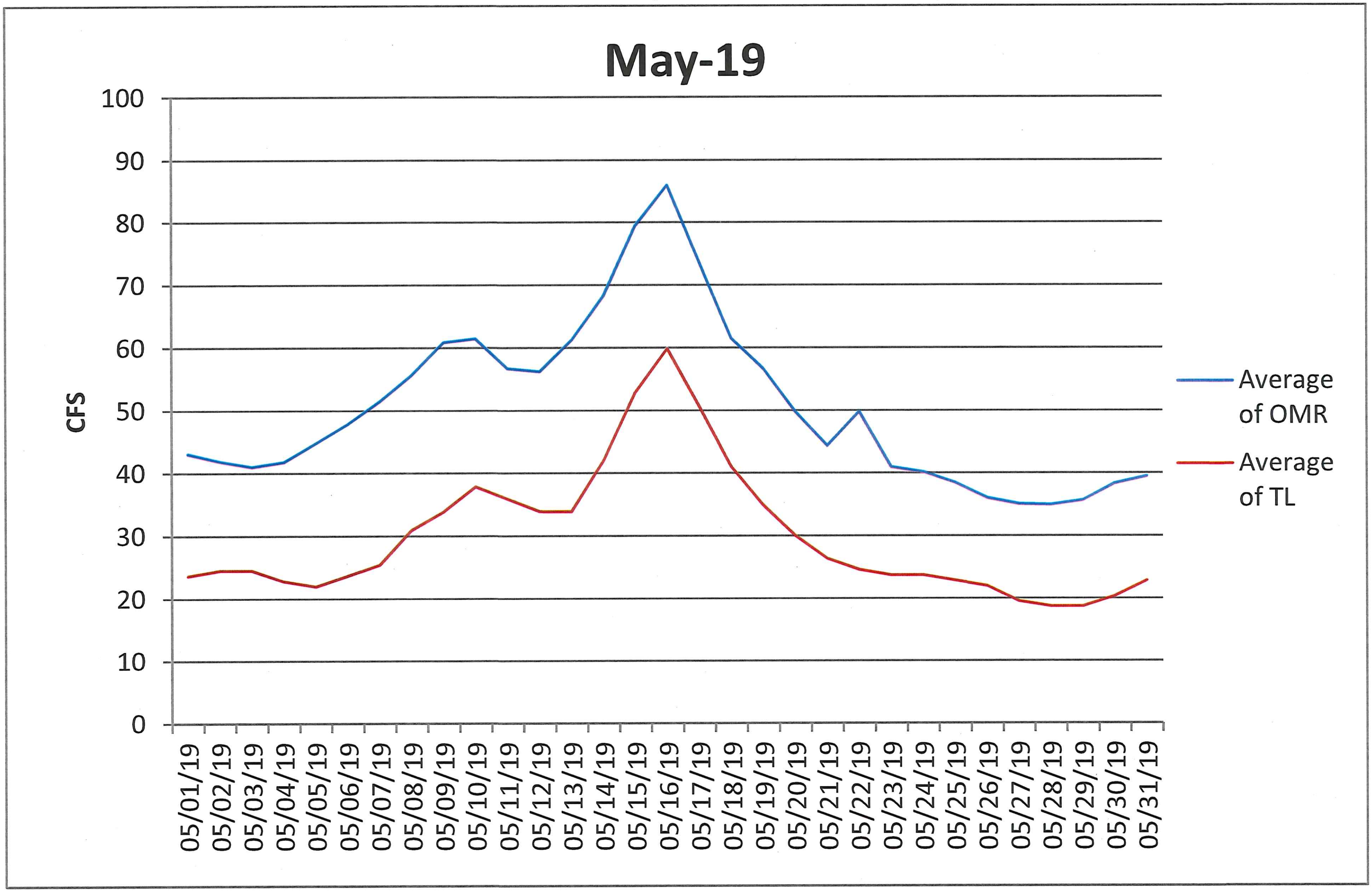

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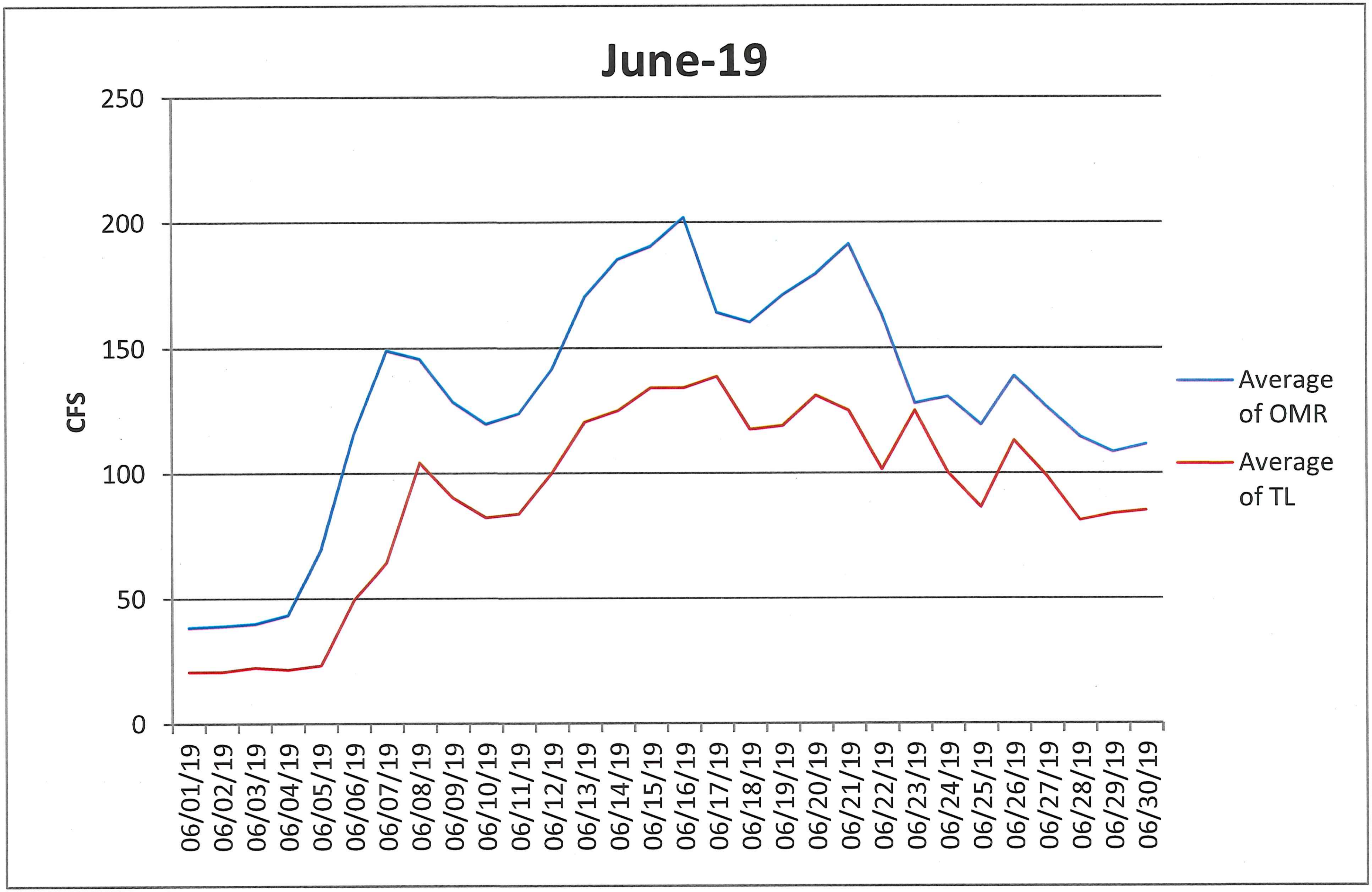

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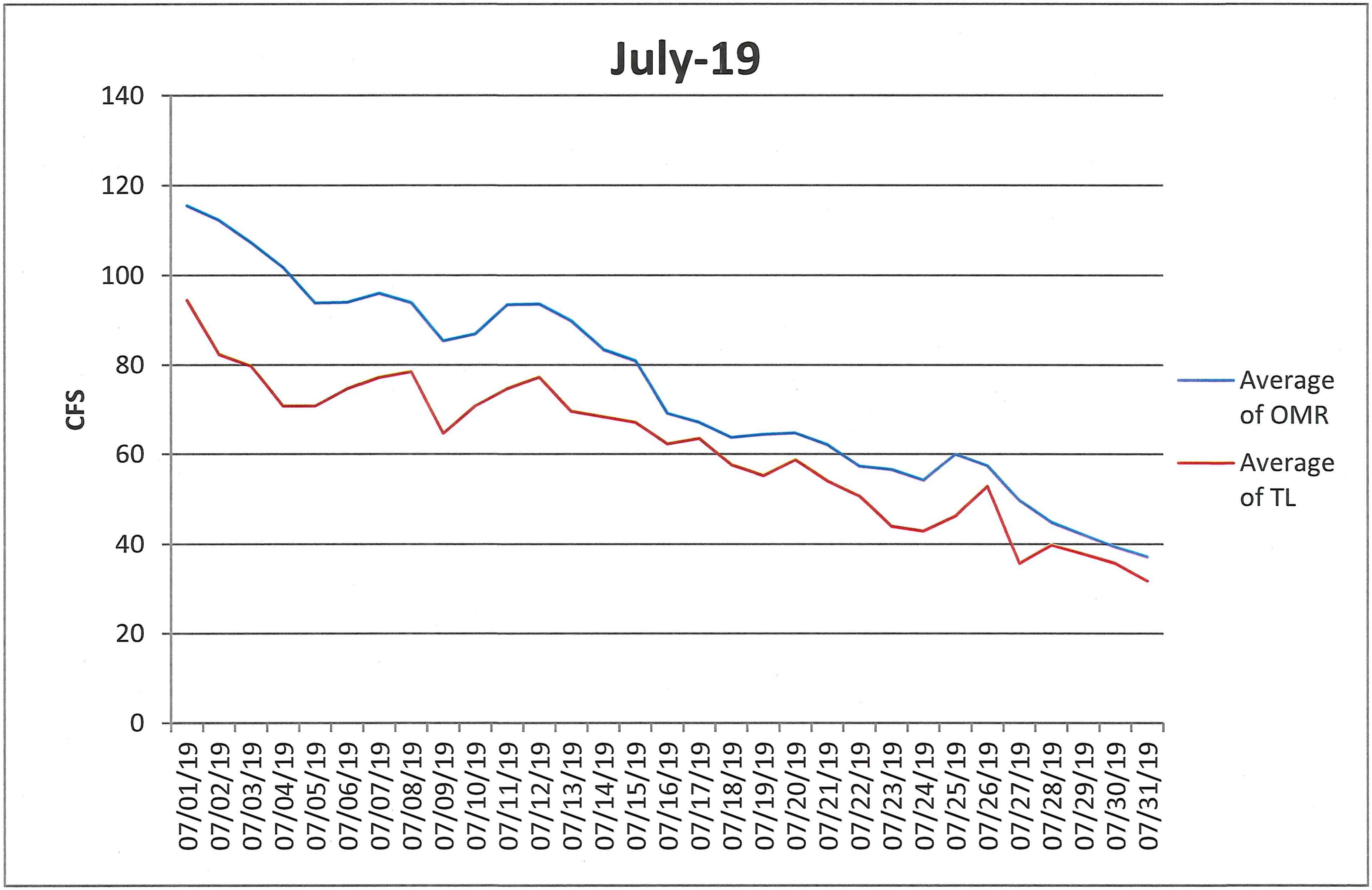

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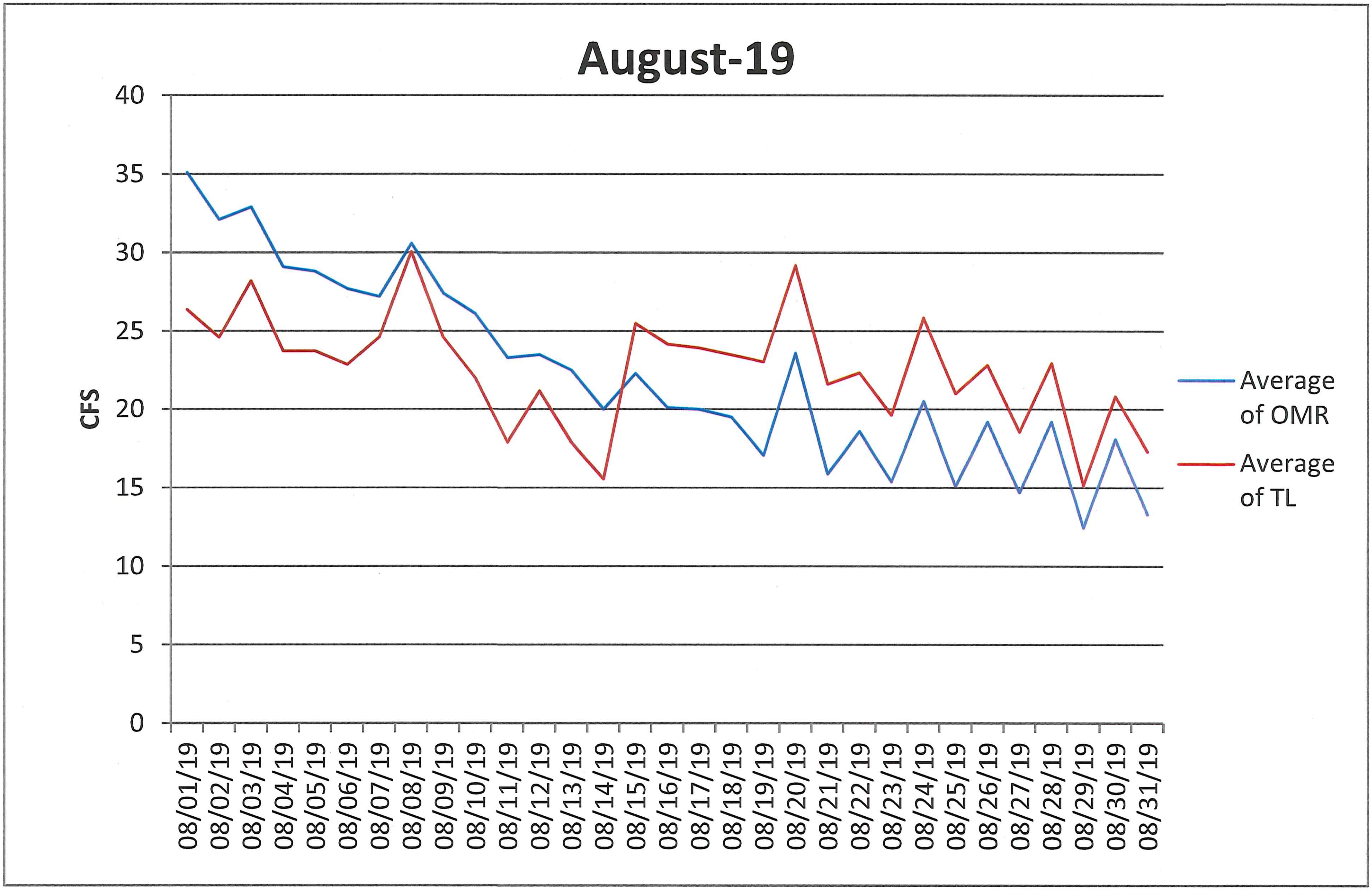

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TWIN LAKES/OLD MAMMOTH